

The MINING CONGRESS JOURNAL

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American Mining Congress in Annual Convention

Notes on the Modern Silver Question

Anthracite Industry in 1927

Bituminous Coal Industry in 1927

Oil Shale Progress

Progress in Standardization in 1927

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Legislative Review

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The Inspiration Leaching Plant
Retreatment of Concentrates at Mian'a

Belt Conveyor Transportation of Coal
Rock Loading at Two Pennsylvania Mines

Reports on the Mechanization Survey

Contributors:

W. Mont Ferry, Edward W. Parker, Allan H. Willett, Victor C. Alderson, Col. Warren R. Roberts, H. K. Porter, E. C. Auld, Harold J. Sloman, J. H. Rose, H. W. Aldrich, H. B. Hunt, G. B. Southward.



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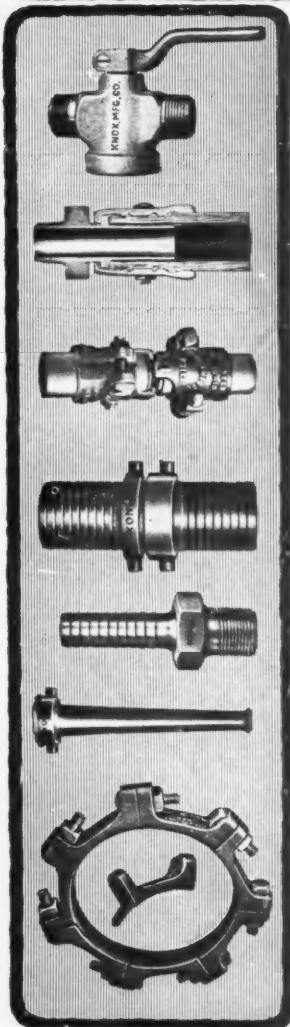
XI

KNOX

Valves-Couplings-Nipples-Clamps-Menders

MINING SPECIALTIES

The World's Standard

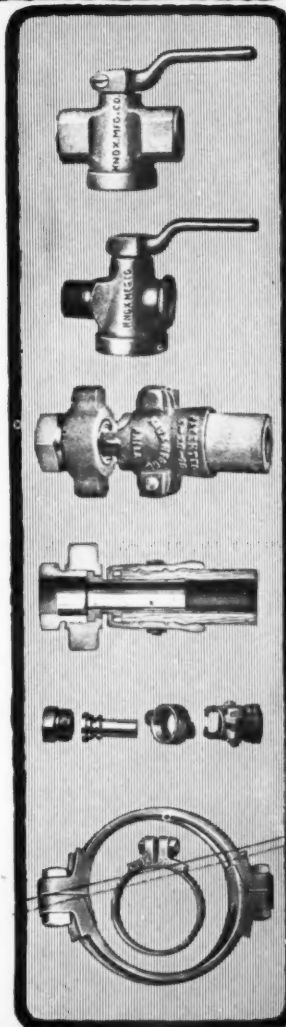


**We Are Devoting
Our Energies
to Just One Thing---
The building of
Valves and
Couplings.**

That's why you

**SPECIFY
KNOX**

for better service.

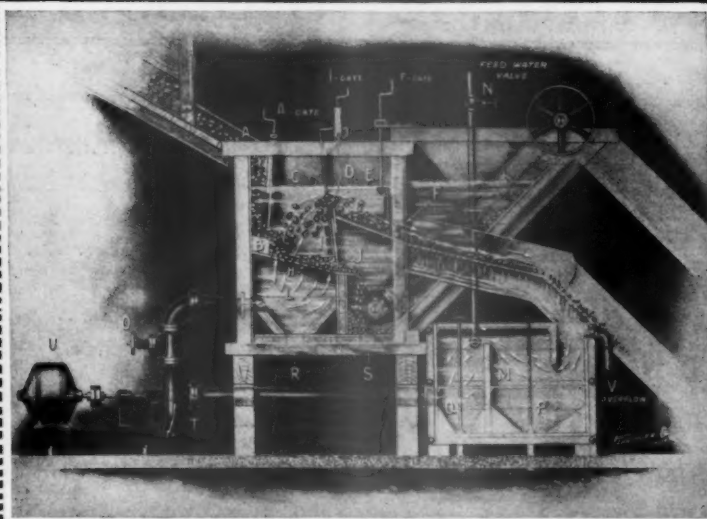


KNOX MANUFACTURING CO.

INCORPORATED 1911

817 Cherry St.

Philadelphia, Pa.



Know Ye: - - -

that the Roberts and Schaefer Company, recognizing a decided need for improved cleaning methods to meet the market demand for bituminous coal of low ash content, has acquired the Menzies Hydro Separator. This we present in combination with the Arms Concentrator as a complete wet and dry process for separating and cleaning coarse and fine sizes of coal.

The many advantages of this complete cleaning system—wet process for coarse sizes, and dry for fines—overcome the usual disadvantages attendant upon the application of incorrect cleaning methods.

Our engineering and construction facilities are available to operators interested in complete cleaning plants to suit individual requirements—a combined wet and dry process that is low in first cost, maintenance and operation. May we send you a copy of Bulletin No. 102

ROBERTS AND SCHAEFER CO.

ENGINEERS AND CONTRACTORS
CHICAGO, U. S. A.

PITTSBURGH, PA.
418 Oliver Bldg.

HUNTINGTON, W. VA.
527 1st Street, Box 570

THE MINING CONGRESS JOURNAL

DECEMBER, 1927

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PRACTICAL OPERATING MEN'S DEPARTMENT

COAL

*Belt Conveyor Transportation of Coal
Rock Loading Operations at Two Pennsylvania Mines*

METALS

*Reverberatory Practice at Magma Smelter
The Inspiration Leaching Plant
Retreatment of Concentrates at Miami Copper Co.*

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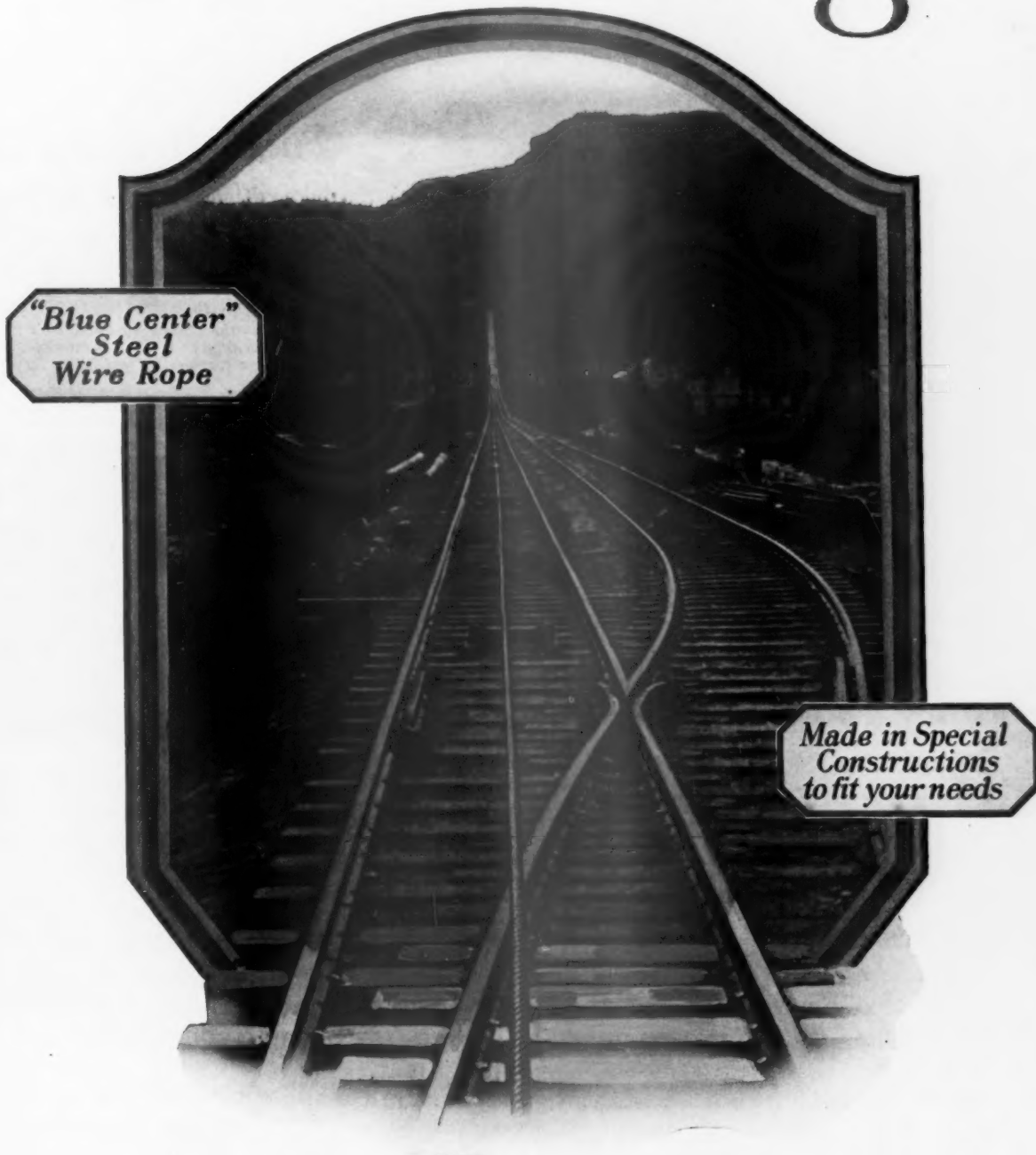
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Roebling



A superior product constructed to meet the
most exacting requirements in mine service

John A. Roebling's Sons Company

Trenton, New Jersey

Long Face Mining with the Conveyor-Loader A Better Grade of Coal



The Jeffrey 44-B Conveyor Loader

The photograph at the left shows the 44-B Conveyor-Loader advanced in an irregular outline to follow the contour of the shot coal.

Below the Conveyor-Loader is discharging to a 47-A Sectional-Conveyor.



ON a long face having a free end less powder is required to shoot coal than is necessary for a short face that is tight at both ends. There is less shattering of the coal resulting in a better grade of large lumps.

To secure the greatest return from concentrated working, the coal should be loaded out quickly. This is best accomplished by means of a conveyor

that remains close to the face, thus permitting close timbering which reduces the uncertainties of roof control.

Being narrower than any other device available for loading out coal, the Jeffrey 44-B Conveyor-Loader meets these requirements, but further than this, it is so constructed that it

Branch Offices: New York
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JEFFREY

er Means--- at Lower Cost

will not be damaged by any reasonable fall of coal, rock or slate. The rock can be conveyed away immediately and the conveyor is again ready to load out the coal.

Coal can be shot directly onto the conveyor. After the coal, which falls on the conveyor, has been loaded out the conveyor can be moved forward. Large lumps can be rolled on without lifting them.

Its flexible design permits the conveyor to follow closely the irregular contour of the shot coal.

This machine cannot be overloaded. It positively carries away all coal as fast as it can be loaded onto the conveyor.

The Conveyor-Loader carries the coal to a 47-A Sectional Conveyor which, in turn, empties into a train of cars on the entry.

Use of the Conveyor-Loader results in a reduction of the cost per ton in two ways

First—Direct cost of labor to cut, drill, load and convey the coal is reduced by increasing the average output per man. This saving is considerable even after making ample allowance for depreciation, maintenance, and interest on investment.

A very substantial saving is also made in general maintenance cost. The actual working area is cut to a small fraction of that required in ordinary room and pillar system for the same tonnage. This reduces the cost of ventilation, drainage, trackage, keeping haulage ways open, timbering inspection and other items of overhead cost.

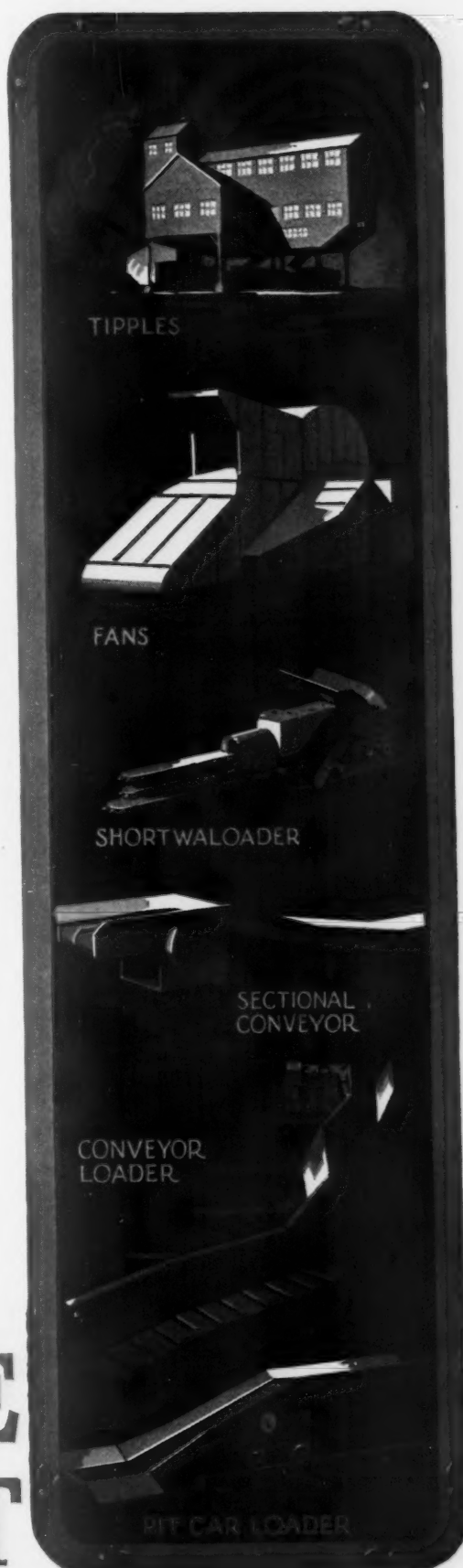
How the Jeffrey Longwall Mining Machine is used with the Conveyor-Loader is shown on the next page.

The Jeffrey Manufacturing Company

958-99 North Fourth Street, Columbus, Ohio

Denver Charleston, W. Va. Salt Lake City Montreal, Canada
Pittsburgh, 600 Second Ave. Scranton, 122 Adams Ave. Terre Haute, Ind., 319 Cherry St.

COAL MINE EQUIPMENT



The Jeffrey 24-B Longwall Mining Machine Increases Safety on

Safety is of prime importance in any system of mining.

Two factors that largely determine the safety of the men working on long faces are: first, quiet operation of mining machines so that any movement or working of the roof can be quickly detected, and second, close timbering to protect them against roof fall. Close timbering requires narrow machines that work parallel with the face.

Operates Quietly

Driving from the motor through a single worm and worm gear to the cutter chain sprocket makes the Jeffrey 24-B Longwall an extremely quiet machine in operation.

The rate of the feed speed may be varied by adjusting a pawl, driven by an eccentric, so that more or fewer teeth on the ratchet, which is geared to the feed drum, may be engaged at a time. A handling speed for quick moving is also provided by auxiliary gearing driving the rope drum through a disc clutch.

Simple Rugged Construction

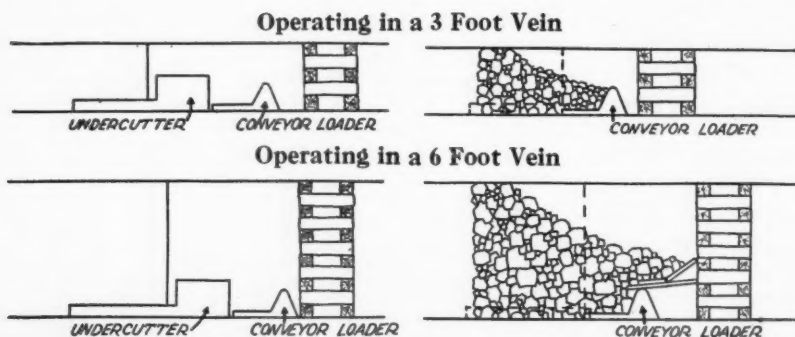
The simple design of this driving mechanism requires but few parts which are rugged and liberal in every detail, resulting in long, dependable service.

The machine can be powered with either a direct or alternating current or an air turbine. The motors are 50 H. P., providing ample capacity for all operating conditions.

The bed frame, in which is mounted the operating mechanism, is made of heavy cast steel, providing a rugged protection for all internal parts and enabling the machine to withstand operating contingencies.

Lies Lengthwise Along Face

When undercutting, the 24-B Longwall lies lengthwise along the face. The cutter bar is sumped into the coal by swinging it with a power-driven rope from a position parallel to a position at a right angle to the frame. There the cutter bar is locked and the machine fed along the face. The cutter bar is so mounted that it can be swung through an arc of 180°, permitting the machine to cut in either direction.



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JEFFREY

Long Faces



Cuts on Bottom

This machine cuts on the bottom, leaving the bottom smooth and making it easy to hold a straight face without being influenced by any ridge on the bottom that may have been left by a preceding irregular cut. The use of skids and jacks, and the picking of bottom are reduced to a minimum.

Low and Narrow

The overall width of the Jeffrey 24-B Longwall is only 31 inches and the overall height is as follows: D. C., 18 inches; A. C., 20 inches; Compressed Air, 18¼ inches. These dimensions indicate how carefully this machine has been designed for working with the Jeffrey Conveyor-Loader in a minimum space between cribs, cogs, props, etc., and face. The diagrams on the opposite page illustrate how this machine and the Conveyor-Loader operate in both high and low coal. The space between the face and timber is from 5 to 6 feet.

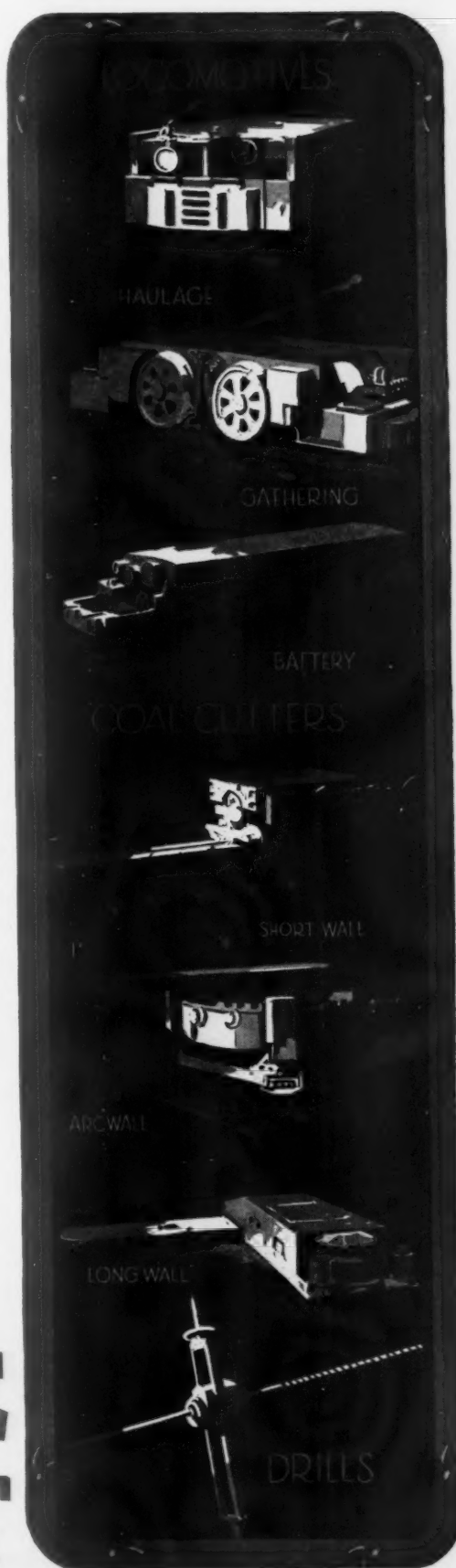
Are you interested in having additional information about the Conveyor-Loader and Longwall Machine?

The Jeffrey Manufacturing Company

958-99 North Fourth Street, Columbus, Ohio

Denver Charleston, W. Va. Salt Lake City Montreal, Canada
Pittsburgh, 600 Second Ave. Scranton, 122 Adams Ave. Terre Haute, Ind., 319 Cherry St.

COAL MINE EQUIPMENT





SYMONS

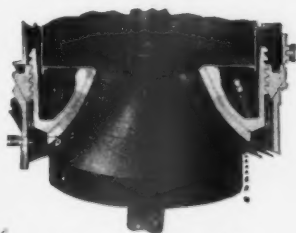
crush a uniform product

and this means always
a greater capacity

Regardless of the type of plant you operate—its total capacity is governed entirely by the time required for your crushing equipment to bring the material to a specific **usable** uniform size.

Symons CONE Crushers will increase your total output—(1) because they can be set much finer than either “jaw or gyratory.”—(2) this reduces circulating loads and recrushing of over sizes.—(3) therefore the crushers (Symons CONE) are at all times crushing new material, producing with one operation a uniform product.

Symons CONE Crushers crush either wet or dry material. Size of finished product can be changed while crusher is operating.

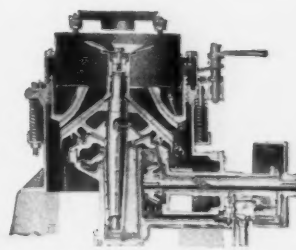


Illustrating the crushing action of the “Cone”

The CONE crushing head moves 5 times as great a distance and gyrates faster than the ordinary “gyratory” crusher. The “lower part of the head” and the “lower part of the bowl” are parallel for a sufficient distance to insure the “head” making one complete gyration before the material passes out of the crushing zone.

This crushing process makes possible a set for a finer product than can be obtained from other crushers.

There is a lot more to be said on this—why not write for complete catalog.



Sectional — showing Positive Oiling System

SYMONS BROTHERS COMPANY

1462 STANLEY AVE.
LOS ANGELES (HOLLYWOOD)
CALIF.

111 W. WASHINGTON ST.
CHICAGO,
ILL.

51 E. 42nd ST.
NEW YORK,
N. Y.

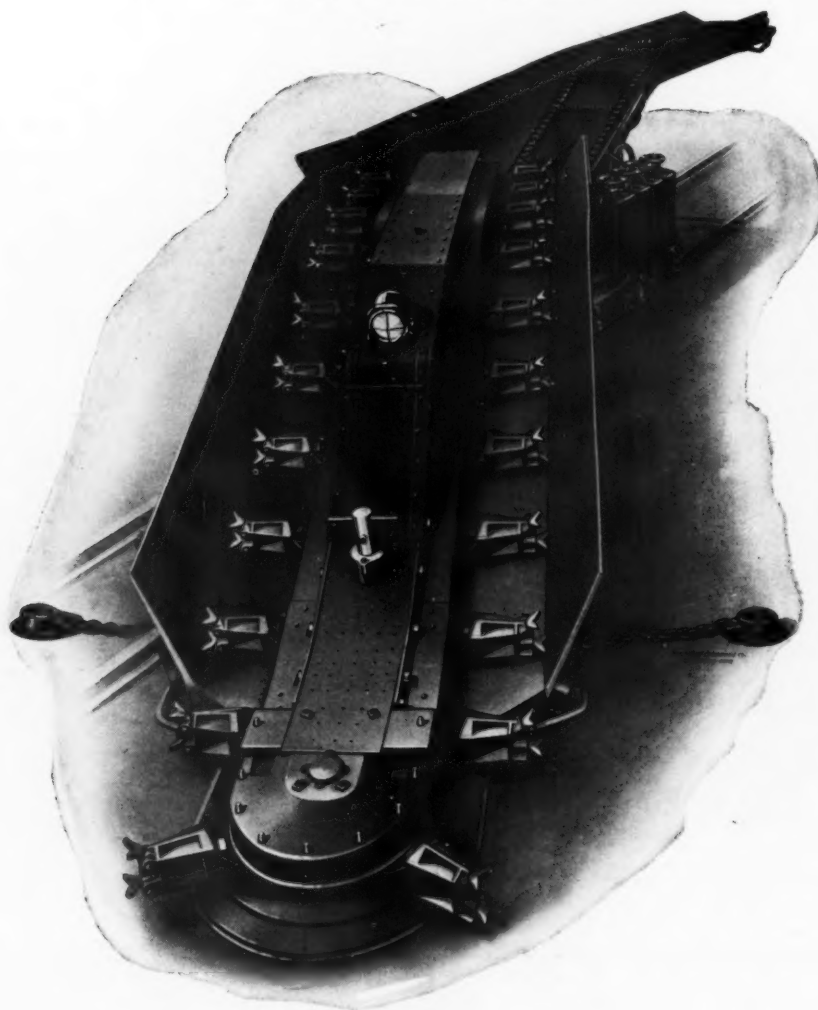
CONE CRUSHERS

The COLODER

*For room and pillar mining with
wide rooms in high coal:*

The Type F Coloder

It Stays on the Track



THE COLODER COMPANY, Columbus, O.

The COLODER

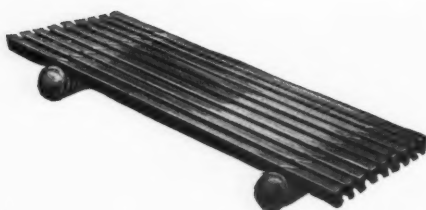
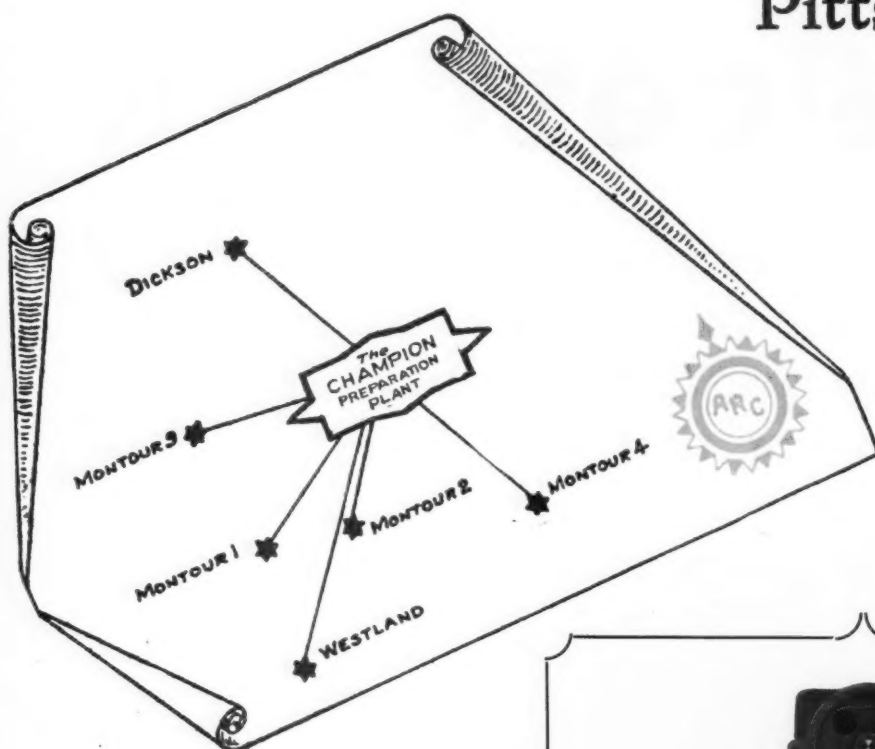
Man day tonnage is the index of cost of production. In one mine under similar conditions are two sections: One with hand loaders and the other with a COLODER. The following is a comparison of average performance.

	Hand Loading Section I	Coloder Loading Section II
Day Men	10	21
Diggers	10	
Total Labor	20	21
Average Cars Loaded	40	94
Average Tonnage	156	367
Tons per Man Day on Sidetrack	7.8	17.4

To determine the saving in labor cost of COLODER loading versus hand loading interpret these figures in terms of your own wage rates. The man day tonnage in each case will change with varying conditions but the ratio will be maintained.

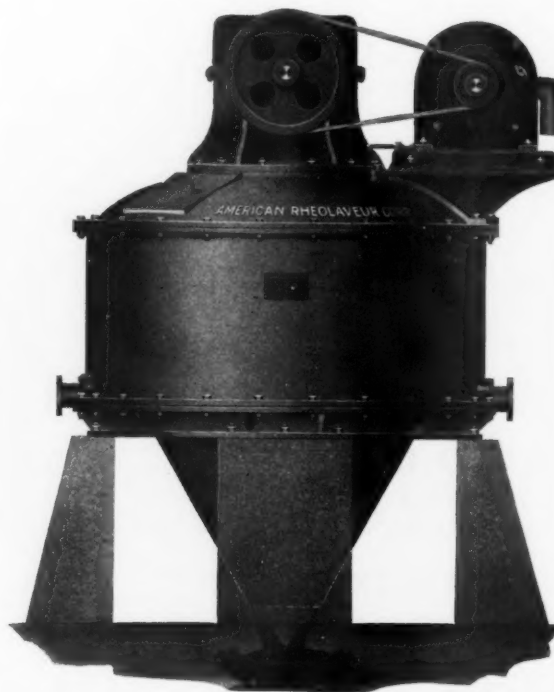
THE COLODER COMPANY, Columbus, Ohio

Pittsburgh Coal For



WEDGE WIRE SCREEN

300 square feet of Wedge Wire Screens will be used for preliminary dewatering before screening.



CARPENTER CENTRIFUGAL DRIER

The "Champion" Preparation Plant will also contain three Carpenter Centrifugal Driers each with a capacity of 75 to 100 tons per hour to dry the $\frac{3}{8}$ " to 48 mesh washed coal. These Driers will assure low moisture content of these sizes when shipped.

Company Chooses Rheolaveur Its "Champion" Preparation Plant Output of 6 Mines to be Cleaned

TO MEET the new-day demand of discriminating markets by producing coal of unvarying high quality at the lowest possible cost

- to ASSURE high recovery by efficient separation
- to PROVIDE dependable operation with definite control
- to OBTAIN the largest tonnage per man

THE PITTSBURGH COAL COMPANY selected the RHEOLAVEUR for their appropriately named "CHAMPION" PREPARATION PLANT.

This "CHAMPION" plant, now under construction, will prepare and clean coal from 6 Mines—Dickson, Montour Nos. 1, 2, 4 and 9 and Westland. This plant will have a capacity of 13,000 tons per day, and will have the largest daily output of any coal cleaning plant in the World.

Six sizes of coal—or any mixture of these sizes—can be produced. Coal above 4" will be hand-picked while all coal from 4" to 0 will be washed in a Rheolaveur plant having a capacity of 500 tons per hour. The washed coal will have its moisture reduced before shipment to a point that will preclude any trouble from freezing. The

$\frac{3}{8}$ " to 48 mesh coal will be dried by the Carpenter Centrifugal Drier.

The Pittsburgh Coal Co. decided to use the Rheolaveur Process after a complete survey of the washability characteristics of the coals from these mines and of the first cost and operating costs of the various cleaning processes and equipment.

The Pittsburgh Coal Company's decision confirms our contention that bituminous coal to meet the most stringent market demands can be produced economically and efficiently by a wet washing process followed by drying of the finer sizes of coal.

AMERICAN RHEOLAVEUR CORPORATION

NEW YORK OFFICE
120 BROADWAY

WILKES-BARRE OFFICE
911 COAL EXCHANGE BLDG.





UNION CARBIDE SALES COMPANY
Unit of Union Carbide and Carbon Corporation
 Carbide and Carbon Building, 30 East 42d St.
 New York



PEOPLES GAS BLDG.
 Chicago, Ill.

ADAM GRANT BLDG.
 San Francisco, Cal.

Union Carbide Warehouses in 190 Cities

A CONTINENT lies between them, but, as far as Union Carbide is concerned, Portland, Oregon, and Portland, Maine, are next door neighbors.

Orders for Union Carbide received today from Portland, Oregon, and from Portland, Maine, will be delivered at each place within twenty-four hours.

This kind of delivery service is made possible through the Union Carbide warehousing system. Union Carbide is quickly available from more than 190 warehouses located at strategic points throughout the country.

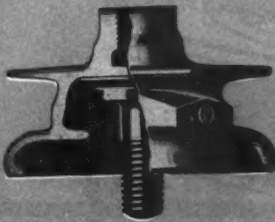


Union Carbide Sales Company's Warehouses

Shipments always made on day orders are received

ALABAMA		MASSACHUSETTS		OKLAHOMA	
Birmingham	2329 First Ave. N.	Cambridge	539 Concord Ave.	Enid	415 Chestnut St.
Mobile	16 S. Commerce St.	Indian Orchard	Paaco Road	McAlester	41-37 East Chickasaw St.
Montgomery	N. Lawrence and Randolph Sts.	Worcester	242 Canterbury St.	Oklahoma City	121 E. Washington St.
ARIZONA		MICHIGAN		West Tulsa	1402 W. 17th St.
Phoenix	42 S. Central Ave.	MINNESOTA		OREGON	
Ft. Smith	201 Rogers Ave.	Detroit	5785 Hamilton Ave.	Klamath Falls	906 Main St.
Little Rock	1400 E. 6th St.	Grand Rapids	435-439 Ionia Ave. S. W.	Portland	15th and Hoyt Sts.
CALIFORNIA		Iron Mountain	513 Stephenson Ave.	PENNSYLVANIA	
Fresno	932 H St.	Iron River	102 4th Ave. P. O. Box 357	Allentown	311 Gordon St.
Los Angeles	539 Gibbon St.	Ironwood	232 W. Ayer St.	Beaver	486 Third St.
Oakland	71 Madison St.	Ishpeming	511 E. Vine St.	DuBois	Weber Ave. and Franklin St.
Sacramento	1717 Third St.	Jackson	318 S. Water St.	Erie	1502 Sasafra St.
San Diego	301 Fourth St.	Kalamazoo	175 E. Water St.	Greensburg	Clark and George Sts.
San Francisco	Adam Grant Bldg.	Lansing	617 E. Shawnee St.	Harrisburg	23 S. Tenth St.
Stockton	748 S. Union St.	Muskegon	410-420 Morris Ave.	Hazleton	223 E. Mine St.
Taft	130 Center St.	Saginaw	1830-1840 N. Michigan Ave.	Johnstown	Messenger St. and B. & O. R. R.
COLORADO		Sault Ste. Marie		Philadelphia	Delaware Ave. and Brown St.
Denver	Nineteenth and Wares Sts.	MISSISSIPPI		Philadelphia	North Front St., P. O. Box 146
Grand Junction	433 South Ave.	Mankato	402-404 Pike St.	Pittsburgh	Lincoln and Tabor Sts.
CONNECTICUT		Minneapolis	334 N. First St.	Pottsville	Railroad and Sanderson Sts.
East Hartford	275 Prospect Ave.	St. Cloud	209 Sixth Ave. N.	Scranton	Penn Ave. and Vine St.
DISTRICT OF COLUMBIA		Virginia	413 Chestnut St.	Shamokin	Fifth and Walnut Sts.
Washington	New York and Florida Aves., N. E.	Vicksburg	1701-03 Levee St., P. O. Box 322	Sharon	Budd St. and South Irvine Ave.
FLORIDA		MISSOURI		Spangler	Bigler Ave.
Jacksonville	1008 E. Bay St., P. O. Box 473	Kansas City	1422 St. Louis Ave.	Williamsport	Canal and Court Sts.
Miami	123 N.W. Twenty-third St., P. O. Box 390	St. Joseph	920 S. Sixth St.	York	204 N. George St.
Tampa	Elizamae Ave. and 13th St., P. O. Box 1303	St. Louis	(See East St. Louis, Ill.)	RHODE ISLAND	
GEORGIA		MONTANA		Providence	Allen Ave. foot of Oxford St.
Atlanta	Haynes & Rhodes St., P. O. Box 1594	Great Falls	420 Second St. S., (P. O. Box 1188)	SOUTH CAROLINA	
Macon	202 Poplar St.	NEBRASKA		Charleston	44 John St.
Savannah	725 Wheaton St., P. O. Box 78	Grand Island	311 West 4th St.	Columbia	900 Pulaski St.
IDAHO		Omaha	1007-9-11 Jones St.	Florence	133 I-2 N. Darlington St.
Boise	606 Front St.	NEW JERSEY		Greenville	15 E. McBee Ave.
ILLINOIS		Camden	Front and Division Sts.	SOUTH DAKOTA	
Chicago	122 S. Michigan Blvd.	Newark	251-35 Ridgewood Ave.	Sioux Falls	204 E. 10th St.
Danville	511 Oak St.	NEW YORK		Watertown	224 First Ave., N. W.
Decatur	133 W. William St.	Albany	Mill and Tivoli Sts.	TENNESSEE	
East St. Louis	700 Broadway	Binghamton	100 Roundhouse Rd.	Chattanooga	600 E. Tenth St.
Eldorado	856 S. Fourth St.	Brooklyn	1085 Grand St.	Jellico	Lock Box 374
Harrisburg	315 S. Granite St., P. O. Box 747	Buffalo	1345 Genesee St.	Knoxville	201-211 Randolph St.
Marion	309 S. First St.	Geneva	261 Exchange St.	Memphis	671 S. Main St.
Monmouth	100-110 Edmund St.	Jamestown	610 W. 8th St.	Nashville	216 Tenth Ave., N.
Peoria	313 Delaware St.	Kingston	O'Neil St., Near Broadway	TEXAS	
Quincy	220 Prairie St.	Middletown	2830 West Main St.	Amarillo	101-105 Pierce St., P. O. Box 697
Rockford	1000 E. Monroe St.	Niagara Falls	376 W. Water St.	Beaumont	366 Liberty St.
Springfield	501 E. Hickory St.	Poughkeepsie	Smith St. and C. N. E. R. R.	Corpus Christi	1017-19 Tiger St.
Streator		Syracuse	376 W. Water St.	Dallas	1118-28 Jackson St.
INDIANA		Utica	135 Hotel St.	El Paso	317 N. Oregon St.
Evansville	1401 E. Illinois St.	Watertown	438 Court St.	Fort Worth	1111 Lamar Street
Fort Wayne	2206 Broadway	Whitehall	35 Main St.	Houston	812 Live Oak St.
Indianapolis	330 W. New York St.	NORTH CAROLINA		San Antonio	500 Dolorosa St.
South Bend	412 East Tenth St.	Ashville	44 Valley St.	Sweetwater	117 E. North First St.
Terre Haute	541 N. Fifth St.	Charlotte	205 W. First St., P. O. Box 777	Waco	617 Jackson St.
IOWA		Greensboro	Macosa and Washington Sts.	Wichita Falls	1307 Lamar St., P. O. Box 1713
Davenport	118 Harrison St.	Henderson	South Garrett St.	UTAH	
Des Moines	Third and Elm Sts.	Kinston	133-35 N. Queen St.	Salt Lake City	108 W. Second South St.
Dubuque	Eighth and Washington Sts.	Mt. Airy	S. Main St.	VIRGINIA	
Fort Dodge	Central Ave. at Sixteenth St.	Raleigh, McCullough & Lenoir Sts.	P. O. Box 149	Emporia	Halifax St. opp. Arch Depot
Ottumwa	207 S. Washington St.	Rocky Mt.	252 N. Main St.	Lynchburg	1324 Commerce St.
Sioux City	410 Court St., P. O. Box 398	Salisbury	600 N. Long St.	Norfolk	120 W. Plume St.
Waterloo	1209 E. Fourth St.	Wilmington	612 Surry St.	Richmond	1709 East Cary St.
KANSAS		Wilson	700 S. Goldsboro St., P. O. Box 516	WASHINGTON	
Dodge City	101 Santa Fe Trail	NORTH DAKOTA		Seattle	304 Railroad Ave., S.
Pittsburg	1201 North Broadway	Bismarck	209 Fifth St.	Spokane	162 S. Post St.
Salina	154 N. 5th St.	Fargo	416 N. P. Ave.	WEST VIRGINIA	
Wichita	600 W. Douglas Ave., P. O. Box 951	OHIO		Bluefield	350 Roanoke St.
KENTUCKY		Akron	97 East South St.	Charleston	Bullit St. and N. Y. C. R. R.
Allen	306 Broad St.	Athens	Corner Factory and Moore Sts.	Clarkburg	608 North Third St.
Central City	107 Main St.	Canton	618 Mulberry Road, S. E.	Elkins	Railroad Ave. and First St.
Hazard	Third St. and Walton Ave.	Cincinnati	67 Plum St.	Fairmont	Auburn St. and B. & O. R. R.
Louisville	Jackson St. and River Rd.	Cleveland	1342 Hanna Bldg.	Huntington	207 Eleventh St.
Middlesboro	1701 Cumberland Ave.	Columbus	310 Dublin Ave.	Morgantown	610 N. University Ave.
LOUISIANA		Dayton	104-114 S. Wayne Ave.	Mount Hope	P. O. Box 472
Monroe	319 N. Ninth St.	Gallopola	651 Second Ave.	Mullens	P. O. Box 37
New Orleans	118 N. Front St.	Lima	338 E. High St.	Wheeling	Forty-third and McCulloch Sts.
Shreveport	4120 Mansfield Rd.	Mansfield	131 E. Fifth St.	Williamson	Foot W. Second St., P. O. Box 305
MAINE		Massillon	405 W. Tremont St.	WISCONSIN	
Portland	48 Commercial St.	Staubenville	324-343 N. Seventh St.	Appleton	909 N. Lawe St.
MARYLAND		Toledo	1201 Buckeye St.	La Crosse	Front and King Sts.
Baltimore	19 E. Lombard St.	Youngstown	Jones and Brittain Sts.	Madison	513-19 William St.
Cumberland	18 N. George St., P. O. Box 172	Zanesville	Main and Second Sts.	Marshfield	First and Maple Sts.
Salisbury	Mill and High Sts.			Milwaukee	619 Trowbridge Ave.
				WYOMING	
				Casper	218-34 Industrial Ave.

"How Can I



Type K-S Hanger
All that could be asked for in a mine hanger. Page 491 of the No. 20 Catalog.



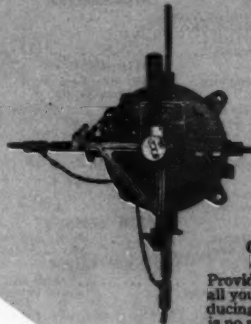
Type A-3 Expansion Bolt
Don't worry about hanger pull-outs with these bolts. Page 486 of the No. 20 Catalog.



New Bulldog Trolley Clamp
The ideal clamp for all conditions. Gives exceptional clearance on curve construction. Page 530 of the No. 20 Catalog.



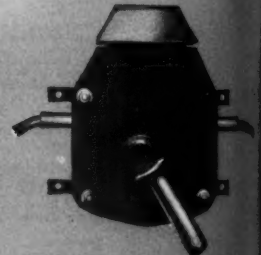
Combination Feeder Sling and Trolley Clamp
Clamping jaws grip both feeder and trolley. Page 504 of the No. 20 Catalog.



O-B Gas Proof Junction Box
Provides fuse protection for all your important coal producing operations. There is no possibility of drawing a spark which might ignite any gas present. Switch and fuse are enclosed in gas tight case. Approved by the U. S. Bureau of Mines.



Type D Trolley Frog
Puts an end to your frog troubles. Pages 567-573 of the No. 20 Catalog.



O-B Circuit Breaker Switch
Sectionalizes the mine and saves costly delays. Automatic in every operation except resetting. Cannot be held against an overload. Send for booklet 50M describing this switch in detail.

O-B PRODUCTS for the mine will best contribute to your plans for the continuous transportation of coal from face to tippie. Not over-night developments, but each device designed with a background of experience and each proved in service.

A few of these devices are shown here. The complete line of mine necessities is shown in Catalog No. 20. We will be pleased to send you a book if you do not happen to have one.



How I Lower My Costs"

"HOW can I lower my costs?" is the paramount question of mine management. In this connection let us consider plugging some leaks in production which are not quite so obvious to first thought. These are the small leaks caused by defective trolley, feeder and return circuits.

Just a few minutes lost here in trolley trouble—10 minutes lost there when a feeder line gives out—poor bonding and slow moving trains; individually these delays do not amount to a whole lot—but

collectively, over a month of time, these losses become a serious matter.

Much depends on trolley and feeder equipment and these small devices cost so little in comparison with the cost of delays, should they fail, that the need for the best in line material is plainly evident.

So, why not spend for the best in the end? Plug these small leaks in production with O-B products for the mine. It will be another step taken to lower production costs.

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
765M



MCM Trolley Splicer
Stronger than new wire. Cuts the number of operations in splicing to 3. Made in all standard wire sizes.



AW-13 Rail Bond
Has hooks for holding the bond in place while welding. Gives a permanent low resistance rail joint. For steel metallic-arc welding process. Page 671 of the No. 20 Catalog.



Type M-3 Section Insulator Switch
A chance to sectionalize trolley circuits. Another chance to stop costly shut downs. You will easily make a 300% return on the investment in these switches. Page 563 of the No. 20 Catalog.



O-B Trolley Shoe and Harp
Cuts collector costs. No arcing. For heavy haulage currents only. Shoe furnished in either steel or bronze.



AW-12 Rail Bond
The favorite in hundreds of mines. Open terminals hold and retain the molten welding metal. Another chance to put bonding troubles behind you. For copper-alloy metallic-arc welding process. Page 670 of the O-B Catalog.

Ohio Brass Co.

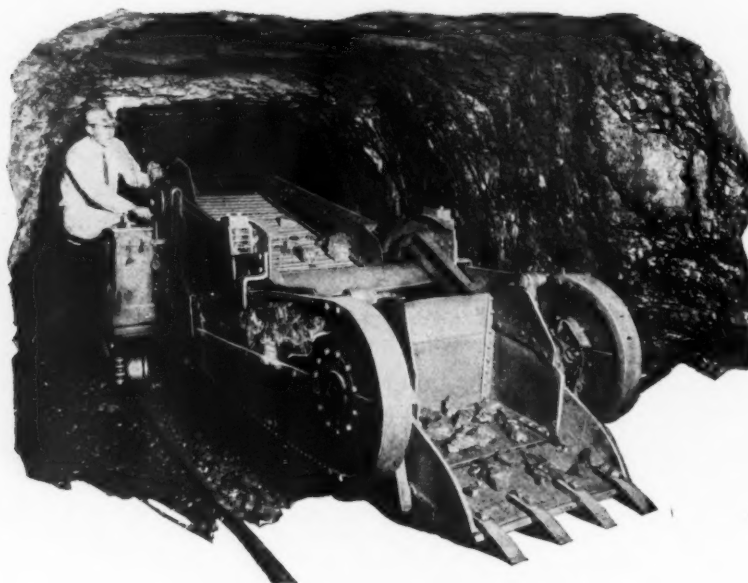
SALES OFFICES: NEW YORK CHICAGO



PHILADELPHIA PITTSBURGH CLEVELAND
SAN FRANCISCO LOS ANGELES

PORCELAIN
INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING
MATERIALS -
VALVES

COAL LOADING--- ENTRY DRIVING---



"BENEFITS FROM USE OF MECHANICAL LOADERS FAR REACHING"

Extracts from article in Mining Congress Journal, pp. 717-718, Sept., 1927

This—

"Benefits derived from the use of mechanical loaders have been so far reaching in their effect on the operation of the mines as a whole that it is almost impossible to estimate, with accuracy, just how much in dollars the use of the machines is reflected in the total cost of production. After a year of careful analysis, there was found to exist a differential of a little over 9 cents a ton in favor of the mechanical loaders as against hand loading methods.

"This figure was arrived at by assuming that it would have been possible to produce a like tonnage by hand loading methods, which, of course, is impossible. No value was assigned for the increased development which permitted the tonnage. This figure will represent at least 5 cents a ton.

"Practically no trouble has been experienced with the loaders, and in the first 16 months only two hours were lost on account of mechanical trouble. In the first year of operation the machine drove 3,411 yards of entry at a labor cost of \$19,565.30 and a repair cost of \$137.96.

and this—

"At the end of 16 months service the first loader was taken out of service solely for the purpose of making a complete examination to find what parts had worn. Everyone was very much surprised to find that practically no part of the machine showed wear, and judging from the service this machine has been subjected to during its 16 months of service, it can readily be expected that, barring accidents, repairs will not be over \$.002 a ton for the next two years."

MACHINES REFERRED TO ARE No. 4 SIZE MYERS-WHALEY SHOVELS

Write us for data on use of machines for tonnage loading of coal, entry driving, taking top or bottom rock in brushing, making grades, reopening aircourse, cleaning up old workings, etc.

MYERS-WHALEY COMPANY

KNOXVILLE, TENNESSEE

Myers The
Pioneer
of
Mechanical
Loaders *Whaley*

Just hit the Clip!



What could be easier? Just hit the clip with any convenient tool. Carnegie Steel Mine Ties eliminate the many objectionable features of wood ties. No rotting or deterioration from repeated spikings. Light and easy to carry. So much less labor. So shallow that they save inches of headroom (quite important in low seams of coal).

Carnegie Mine Ties are made of Copper Steel. This copper content greatly retards corrosion. Double life!

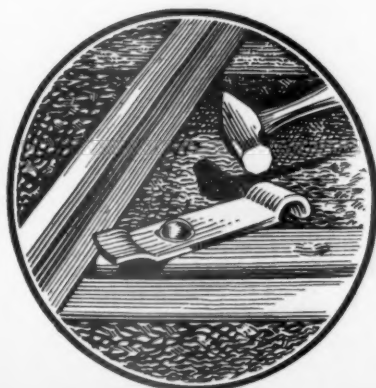
May our representative call?

CARNEGIE STEEL COMPANY

General Offices · Carnegie Building · 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA



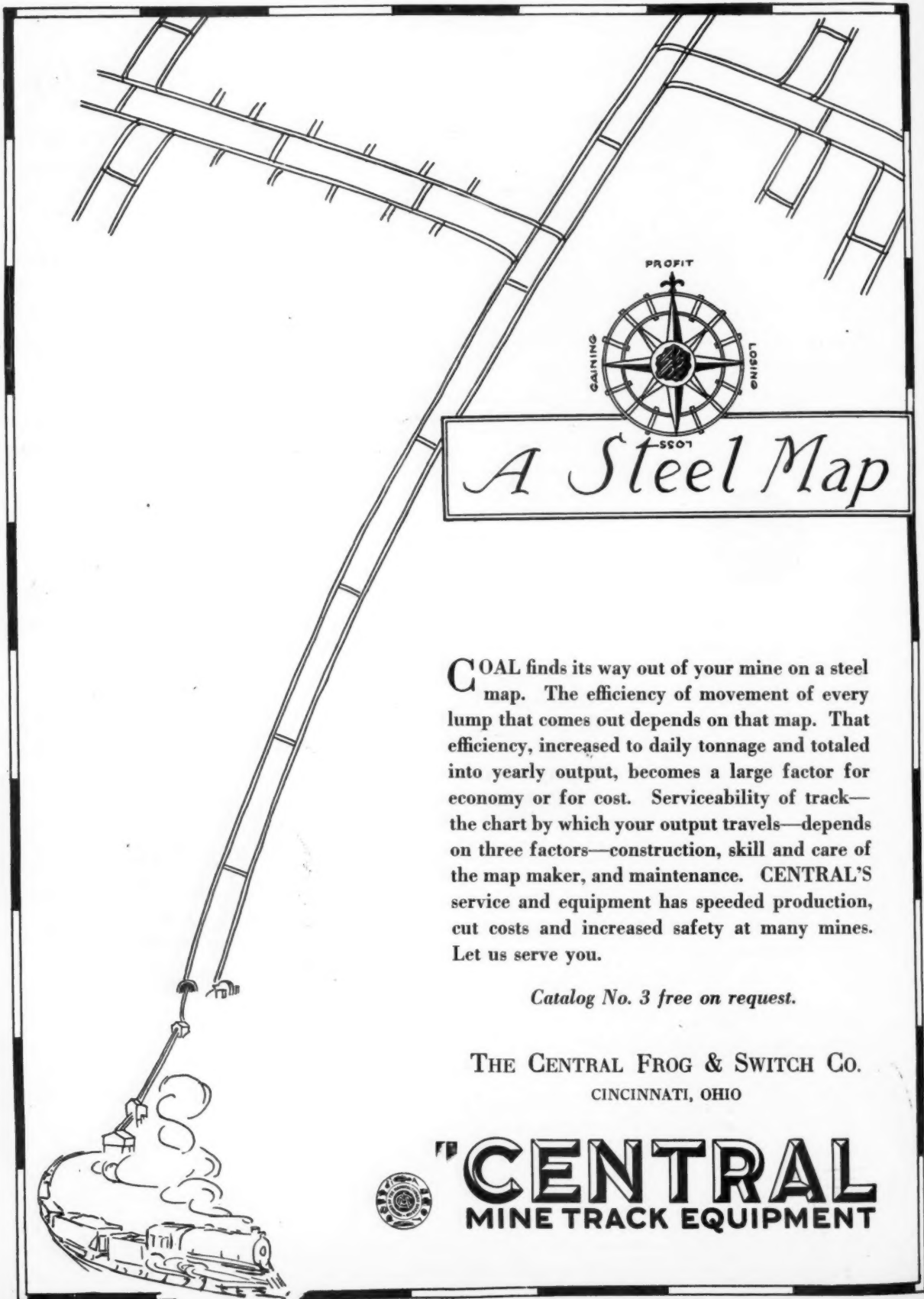
1856



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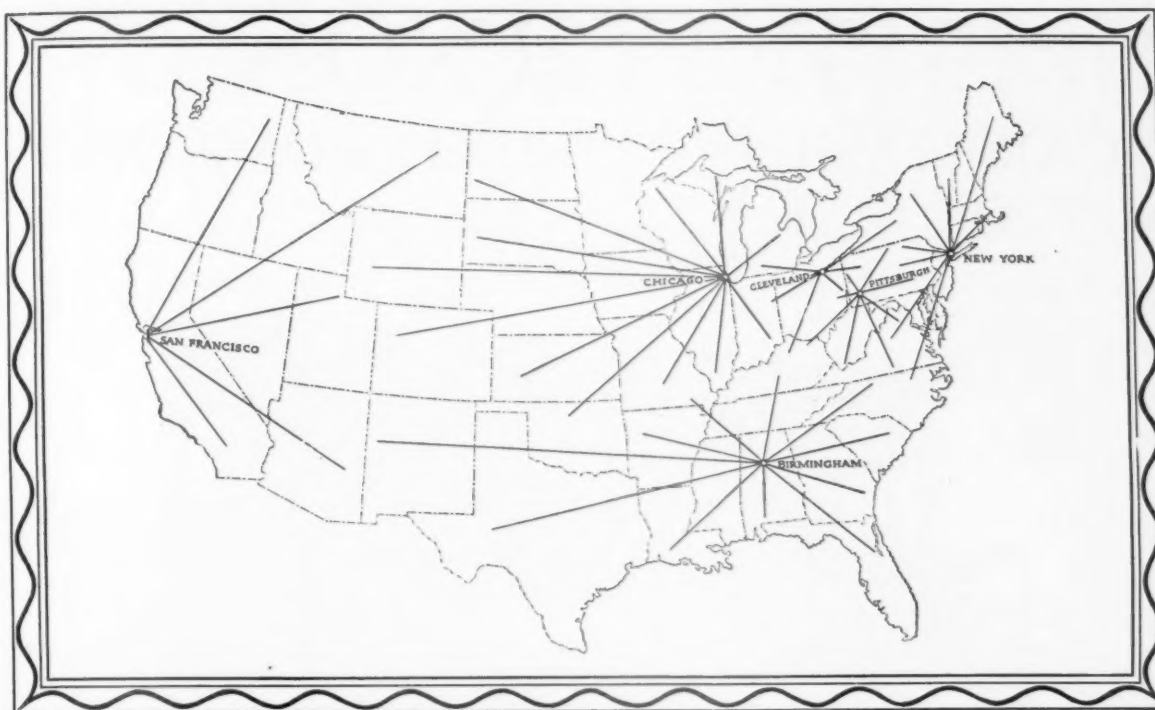
A Steel Map

COAL finds its way out of your mine on a steel map. The efficiency of movement of every lump that comes out depends on that map. That efficiency, increased to daily tonnage and totaled into yearly output, becomes a large factor for economy or for cost. Serviceability of track—the chart by which your output travels—depends on three factors—construction, skill and care of the map maker, and maintenance. CENTRAL'S service and equipment has speeded production, cut costs and increased safety at many mines. Let us serve you.

Catalog No. 3 free on request.

THE CENTRAL FROG & SWITCH CO.
CINCINNATI, OHIO

"CENTRAL"
MINE TRACK EQUIPMENT



National Pyramid Brushes are quickly available to industrial America

UNDOUBTEDLY the NCC Brush Service Plants form a system whose service is one of the most appreciated facilities of modern industry. These plants are ever ready to provide, with the utmost speed, accurately made brushes to the power plants and workshops of the nation. In emergencies, due to accidents or other causes, we have at times been able to make shipment so quickly as to save brush users thousands of dollars that otherwise would have been lost through tie-ups. To take best advantage of the facilities offered by these carefully located plants, it is advisable to have on file in the Emergency Service Plant nearest you a complete record

of your brush requirements, in our Data Sheet System. This system we install without cost or obligation to you. It enables you to order brushes by wire or phone, giving us only the Data Sheet item number of the machine or machines for which brushes are needed. This system is relied upon by many of our customers to simplify brush orders and to enable us to produce brushes with the greatest speed.

Let us tell you more about the service you can expect from our main plant in Cleveland, and from the following Emergency Service Plants in these other industrial centers:

CHICAGO, ILL.
551 West Monroe St.
Phone: State 6092

PITTSBURGH, PA.
Arrott Power Bldg. No 3, Barker Place
Phone: Atlantic 3570

NEW YORK, N. Y.
357 West 36th St.
Phone: Lackawanna 8153

SAN FRANCISCO, CALIF.
599 Eighth St.
Phone: Park 8800

BIRMINGHAM, ALA.
1824 Ninth Ave., N.
Phone: 3-6091



NATIONAL CARBON COMPANY, INC.

Cleveland



San Francisco

Unit of Union Carbide and Carbon Corporation

MT. VERNON

CAR MANUFACTURING COMPANY

Mt. Vernon, Illinois



2617. 70-Ton All Steel Concentrate Car. Can furnish same design in 60-, 50- or 40-Ton capacity, inside dimensions: length, 24' 6"; width, 8' 6"; height box, 5' 6"; gauge, 4' 8½". Couplers, automatic draft gear, friction; brakes, automatic air; trucks, Diamond arch bar type; metal bolsters; metal brake beams; O. H. steel axles; 33" A. R. A. cast iron wheels; U. S. safety appliances; painted and lettered as desired.

Builders of all kinds of freight and industrial cars.

From the smallest capacity used in freight and industrial enterprises to our own or purchaser's specifications.



2053. 27 cu. ft. All Steel Side Dump Car. Inside dimensions: length, 4' 7"; width, 3' 1½"; height, 3' 8"; gauge, 18". Couplers, automatic or link and pin; doors, each side, top hinged; trucks, special 4-wheel mine car type; 12" wheels.

Send us your inquiries stating gauge, capacity, style of truck preferred and any other particulars

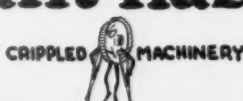
When it comes to lubrication the policy of "LET WELL ENOUGH ALONE" is a dangerous one—it is often followed by



The plants that have reached \$ MAXIMUM EFFICIENCY \$ are not employing inferior lubricants



with their attendant hazards of



etc. They are using a grease that furnishes more and better lubrication at less cost than any other known oil, grease or lubricating compound. IN OTHER WORDS

Keystone Grease

The World's Greatest Lubricant

Keystone Grease is a pure petroleum grease. The formula by which it is made, from high-grade petroleum oils, results in a wonderful lubricating body. —Contains no acid or metal-eating substance —will not pit or scratch—never gums up.

For Every Industry

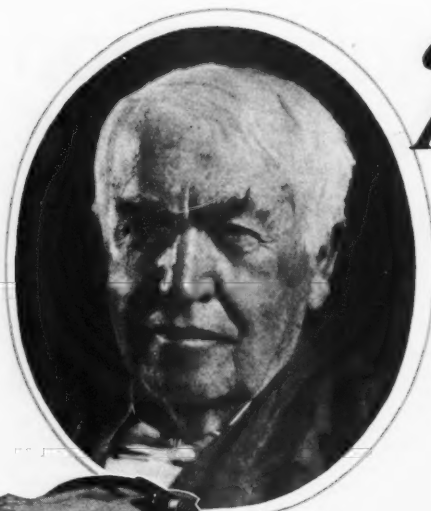
Reg. U. S. Pat. Off.

And no matter how temperatures vary, its consistency remains the same. May we have one of our lubrication engineers arrange a demonstration for you in your own plant—at our expense and risk?

Send for copy of new edition "Densities and Uses of Keystone Grease"

KEYSTONE LUBRICATING COMPANY

21st and Clearfield Streets, Philadelphia, Pa. — Established 1884



A Rugged Edison saves a Miner's life

CAUGHT between a motor and the Rib of an Entry one West Virginia miner owes his life today to the **Rugged Construction** of the EDISON Nickel-Iron Lamp Battery.

Note battery photograph below indicating how the EDISON Battery withstood the impact AND THE MINER IS ALIVE AND WELL TODAY!

The EDISON Electric Safety Cap Lamp is approved by the United States Bureau of Mines for use in any gassy atmosphere.

300,000 EDISONS dominate the field of Electric Safety Cap Lamps today because of their **Rugged Construction, Long-Life** and **Low-upkeep**. That's why ten out of every eleven Electric Cap Lamps used are EDISONS.

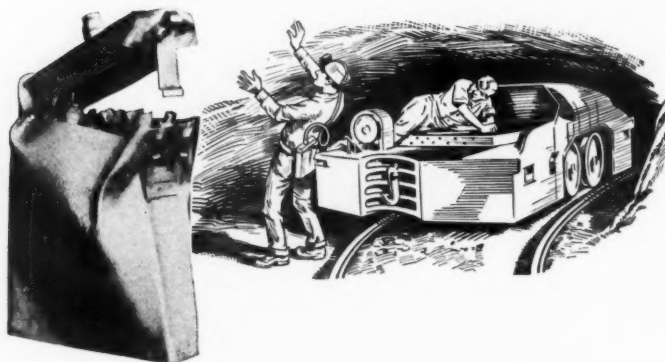
EDISON Mine Lamps are manufactured by the EDISON Storage Battery Company, Orange, N. J., and distributed by M-S-A throughout the United States and Canada.

We have a "No Cash Outlay" Plan on EDISON Lamp Installations. Write us today for complete details. There are no obligations involved.



The EDISON Model E
Electric Safety Cap Lamp

Built Like a Watch
Rugged as a Battleship
With the **Strength** of Steel
and the non-corroding
Long-life of Nickel

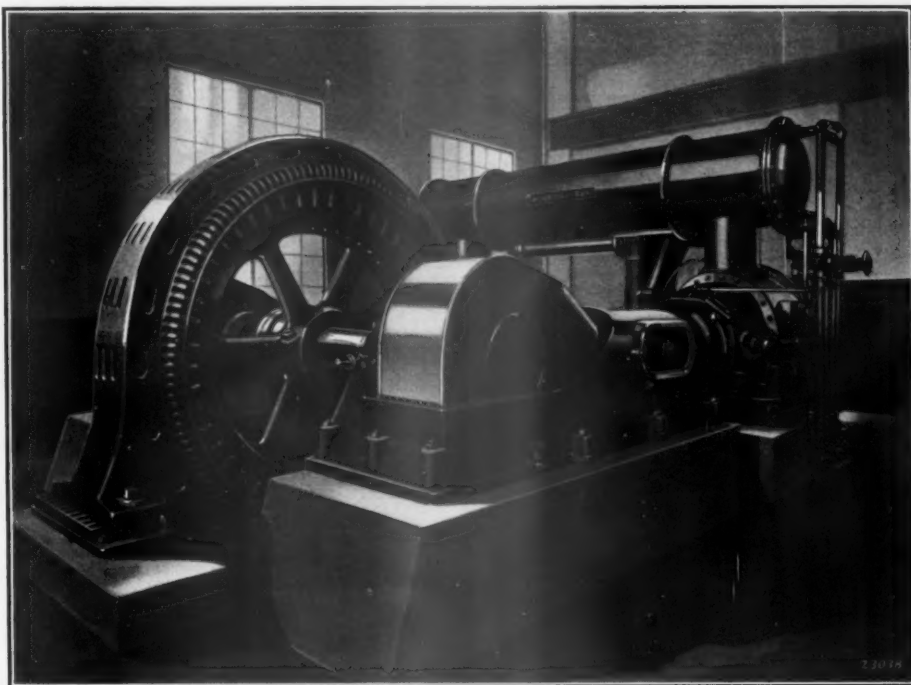


Mine Safety



Appliances Co.

Braddock Ave. & Thomas Blvd. Pittsburgh, Pa.



A 21-in. stroke Type PRE Compressor

Defined in Terms Everyone Knows

HEAVY-DUTY, horizontal, duplex, direct-connected—that tells part of the story, but Ingersoll-Rand Plate Valves and the Patented Five-Step Clearance Control are the features which have been responsible for the thousands of PRE Compressor installations all over the world.

These Compressors are furnished in sizes ranging from 1,300 to 7,440 cu. ft. per minute piston displacement. Some one of them will fit practically any set of conditions where a considerable volume of Compressed Air is required.

The PRE Compressor is one that immediately appeals to the operator and one which soon proves its worth to the owner.

Our Bulletin No. 3326 covering this type of Compressor will be cheerfully furnished by any of our Branches or our Main Office.

For smaller installations there are many sizes and types of I-R Compressors from which to choose.

INGERSOLL-RAND COMPANY, 11 BROADWAY, NEW YORK CITY

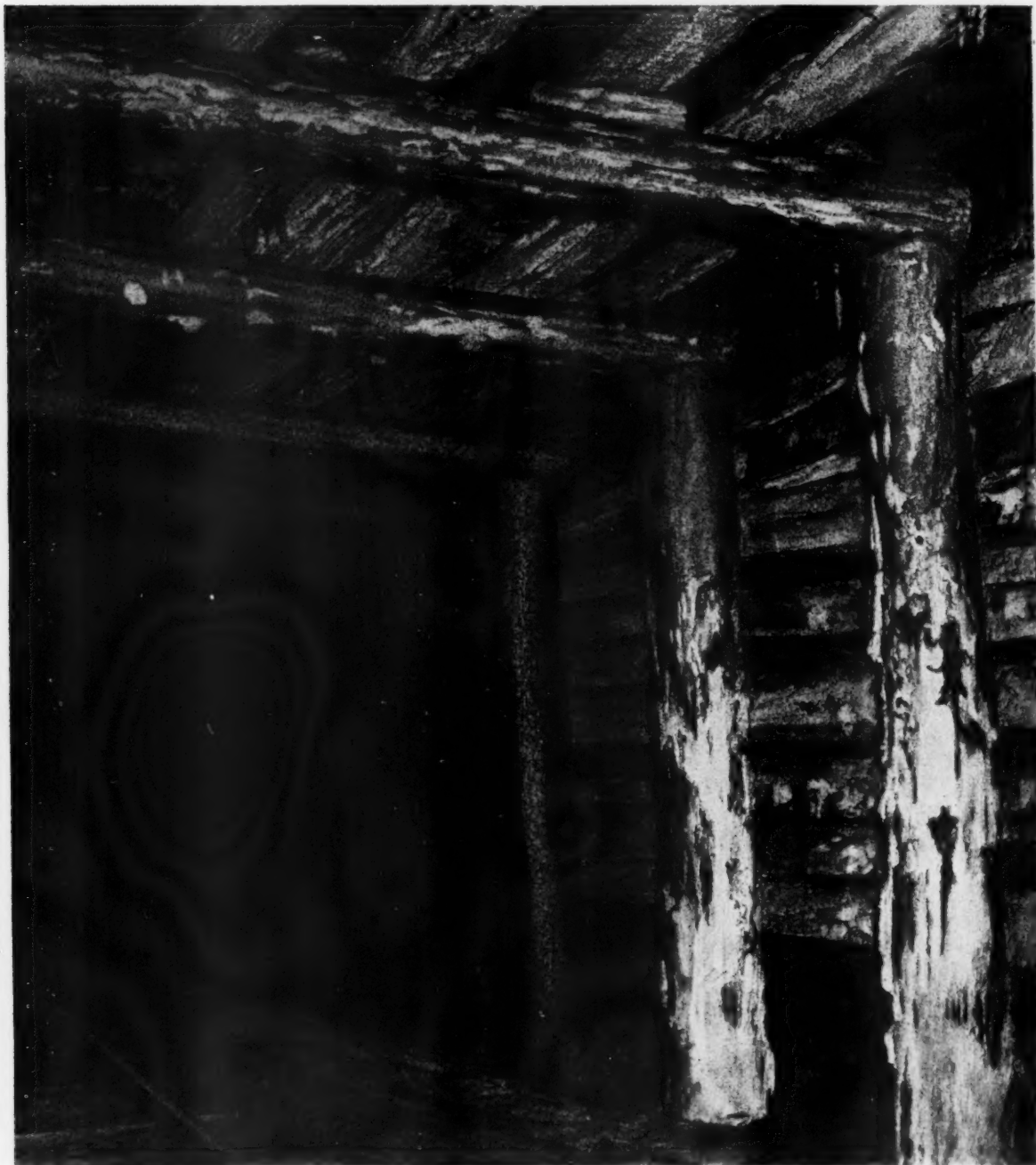
Offices in principal cities the world over

For Canada refer—Canadian Ingersoll-Rand Co., Limited, 260 St. James Street, Montreal, Quebec.

876-G

Ingersoll-Rand

WOLMANIZED TIMBERS



Attainable Saving in Mine Timbering Materially Reduces Production Costs

Wolmanized mine timbers accomplish both economy and safety. The greatly extended life secured reduces the annual average cost of such timbering by more than ONE HALF.

Untreated mine props, ties and lagging in main haulage ways are a menace to safety.

A decayed mine timber is a wholly unjustifiable expense.

Drawing from photograph showing two timbers in foreground that had been treated with other materials one and a half years before. The timbers in the background were Wolmanized and installed seven years previously.

**AMERICAN WOOD IMPREGNATION
CORPORATION**
25 Broadway, New York

**UNITED WOOD TREATING
CORPORATION**
1138 Lake Shore Drive, Chicago



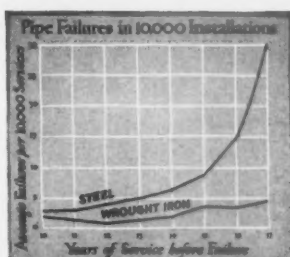
RUST RESISTANCE *proved by the supreme test of* TIME and SERVICE

NOT argument but the evidence of use; not quick findings from short time corrosion tests but the records of long practical experience are the foundations of confidence in Byers Pipe.

The chart here given summarizes a considerable body of such experience. A public service corporation made comparative tables covering pipe failures of wrought iron pipe and steel pipe in its extensive gas lines, for seventeen years. The percentage of failures for wrought iron, throughout the entire period, remained uniformly low, whereas the failures of steel pipe increased at an alarming rate after the fourteenth year.

The observed difference of behavior is due to known causes. At first, rust attacks all ferrous materials alike. Wrought iron, cast iron, steel—they are all alike subject to corrosion. In wrought iron, however, the native slag filaments stand as protective barriers. When the mass of iron begins to rust, more and more of these non-rusting silicate particles, coming to the surface, are opposed to the corrosive attack; and the destructive process is arrested. This is the peculiar virtue of wrought iron.

Explanations, however, are less important than facts.



Note the small number of failures of wrought iron pipe throughout the 17-year period, and the rapidly increasing rate of failures of steel pipe after the 14th year.



Time reveals the practical difference between various kinds of pipe in use. Corrosive tests in a laboratory may indicate something but when they contradict the plain facts of experience, obviously they are of little value.

Byers Pipe is preferred and used, not so much by the casual small buyer of such materials as by important industrial and business corporations, employing expert advice. Far the greater part of all Byers pipe sold, is bought on the specification or counsel of seasoned engineers and architects.

The fact is significant. Interpreted in plain words, it means that Byers Pipe is intelligently bought. Whoever buys it, knowingly pays a premium for it as compared with cheaper materials everywhere obtainable; and he does this for the assurance it gives of longer life.

Bulletins of useful information on Byers Pipe, with records of service, are available for the asking. Tell the nature of your pipe problem, and we will send literature most likely to be of interest.

A. M. BYERS COMPANY

Established 1864 Pittsburgh, Pa.
 New York Houston Los Angeles Philadelphia
 Chicago Detroit Cleveland Atlanta
 Boston Tulsa St. Louis Birmingham
 Cincinnati Rochester Kansas City

Distributors in all Jobbing Centers

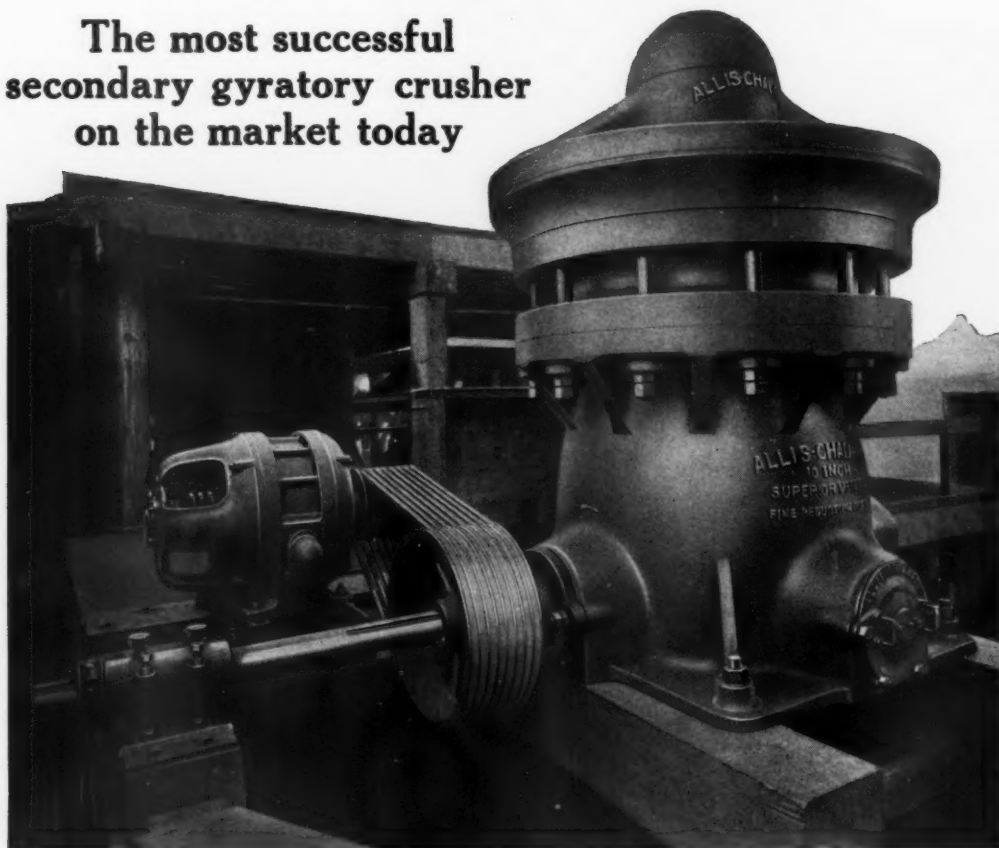
BYERS PIPE

GENUINE WROUGHT IRON



Superior McCully Fine Reduction Gyratory Crusher

The most successful
secondary gyratory crusher
on the market today



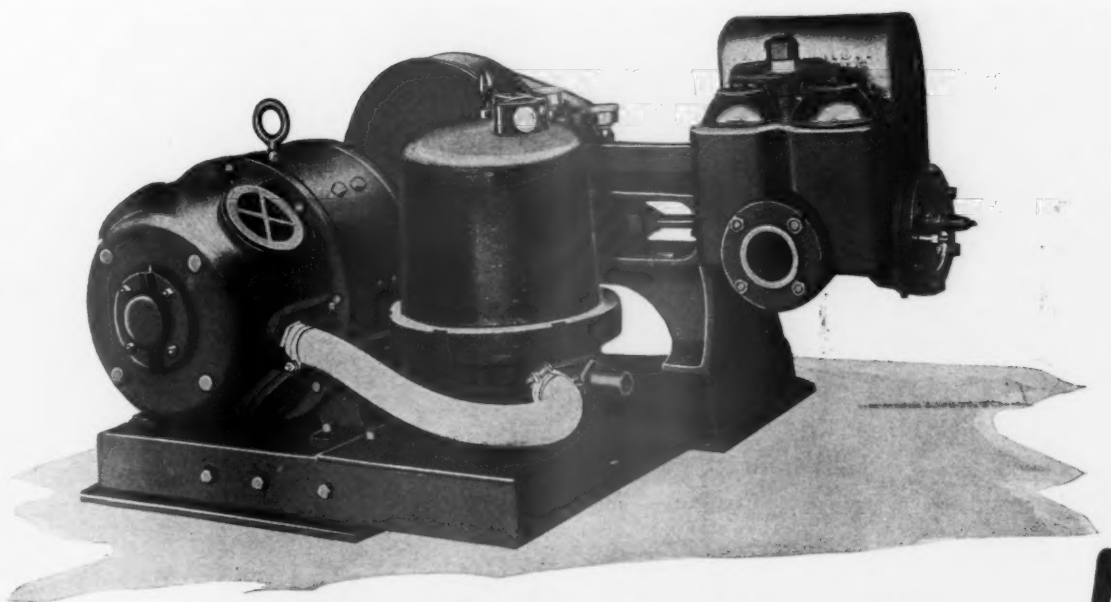
10-Inch Superior McCully Fine Reduction Crusher driven through Texrope Drive from 75 H. P. Type "ARY" Motor. Crusher, motor and drive are all of Allis-Chalmers manufacture

SIZES, CAPACITIES, HORSE POWER AND WEIGHTS

Size of Crusher in Inches	Two Feed Openings, Size Each in Inches	Capacity Per Hour in Tons of 2,000 Pounds												Driving Pulley		H.P. Required	Weight of Crusher in Pounds
		Size of Discharge Opening in Inches												Size in Inches	R.P.M.		
		¾	¾	1	1¼	1½	1¾	2	2¼	2½	3	3½	4				
6	6x40	24	28	32	40	48								36x12½	500	40 50	32,000
10	10x52					80	94	107	120	135				36x19	450	75 100	64,000
18	18x68									250	300	350	400	44x25	400	150 200	182,000

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.



Safer Mining!

With Permissible Motors

WESTINGHOUSE Permissible type motors and control embody all the necessary safeguards for preventing the escape of sparks or flame—the effectiveness of which was clearly demonstrated before the Bureau of Mines.

These motors are explosion-proof and can be used with absolute safety in gaseous or dusty locations. The motor is sturdily constructed to withstand internal explosions and all coils are given dual dip-pings and baking treatment necessary for uniform dissipation of heat.

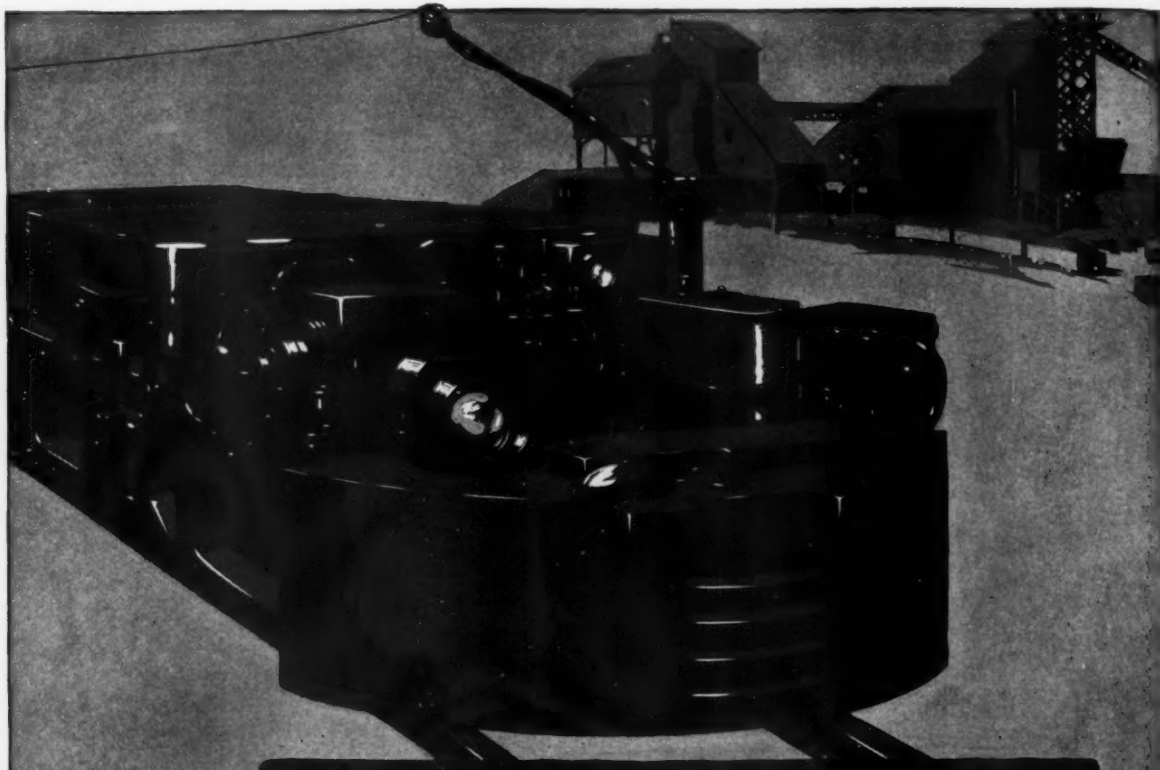
The Permissible Motor is particularly adaptable for driving rock dusters, coal loading and cutting machines, compressors, pumps, conveyors and many tippie drives exposed to weather and severe coal dust conditions. Flexibility of arrangement is an important economic advantage.



Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

Westinghouse

X95576



Timkens in Motors, as in Journals

All mining has embraced Timken-equipped car journals. Every other type has been overshadowed. A comparable situation looms in locomotive journals and mine motors. *Decidedly more than anti-friction bearings*, Timkens produce the greatest motor endurance and economy ever known, with their self-contained, high-capacity thrust-radial characteristics.

This is what makes it possible to disregard operating position and type of drive in ordering Timken-equipped motors. This is what permits extreme compactness, space savings, and improved cooling.

Perfectly enclosed to keep out dirt and hold in grease, Timken armature mountings are virtually wear-proof. A uniform gap is constantly preserved without constant attention. The risk of overheating, rubbing, burn-outs and stoppage is gone. The records of thousands of Timken-equipped motors, in most rigorous service, carry overwhelming conviction. Check that, and you will specify Timken Tapered Roller Bearings in every new motor you buy.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

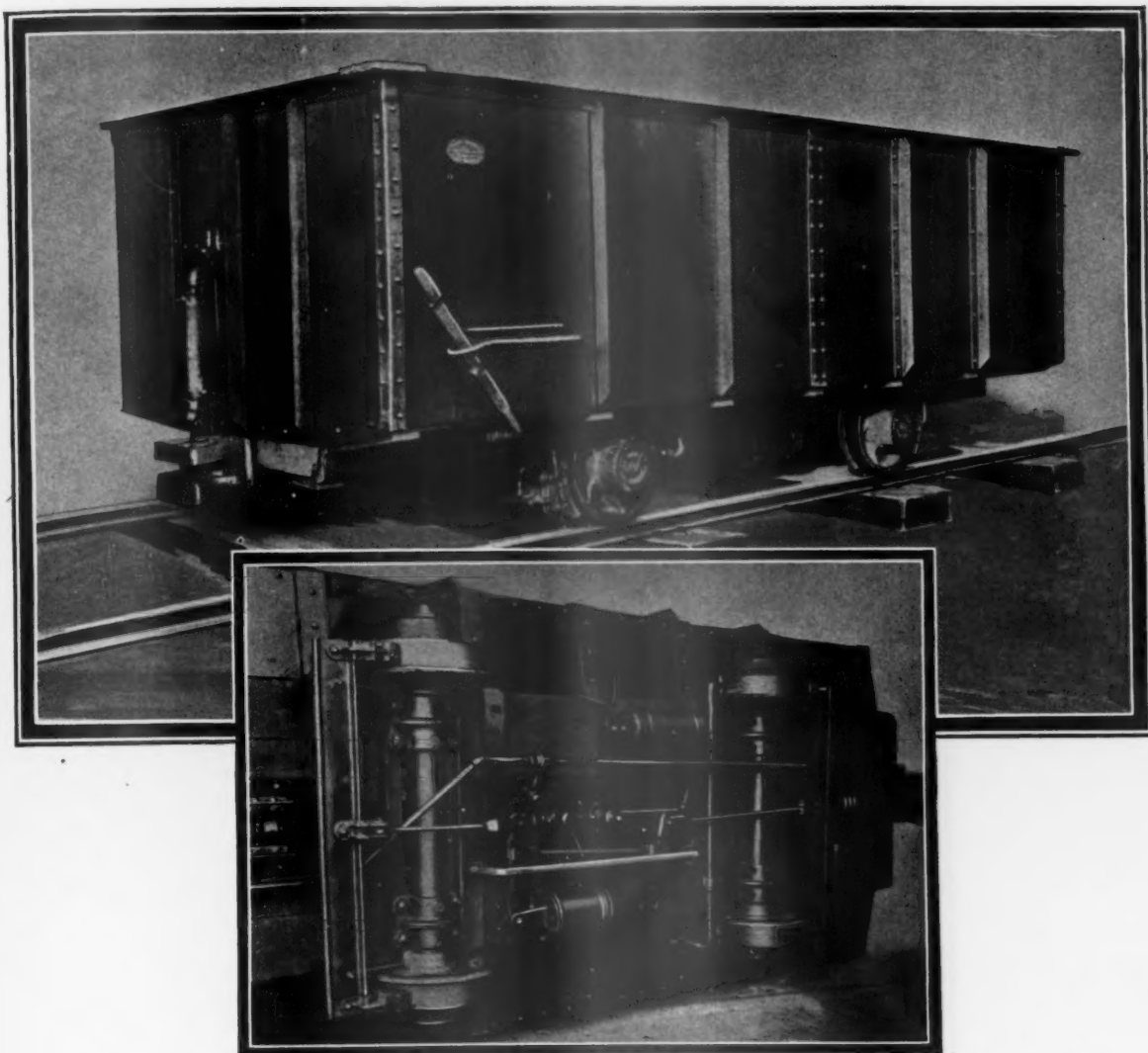
TIMKEN *Tapered* Roller BEARINGS



SINGLE ROW
TIMKEN
BEARING



DOUBLE ROW
SELF-CONTAINED
TIMKEN BEARING



A Revolutionary Development!

AIR brake equipment on mine cars! Here is something new—novel—unique, that may have far-reaching effects on the future trend of mine transportation.

Designed by Hockensmith, with Westinghouse four-wheel air brake equipment, the car is composite type. Water level capacity 320 cubic feet. Cast steel draw heads, fitted

with tension and compression springs. Separate hand operated brakes. Roller bearings. Dimensions: length overall 16 ft.; width overall 6 ft., 6 in.; height off rail approximately 60 in.

The Hockensmith engineers will gladly co-operate with you in solving your particular transportation problems.

HOCKENSMITH WHEEL & MINE CAR CO.

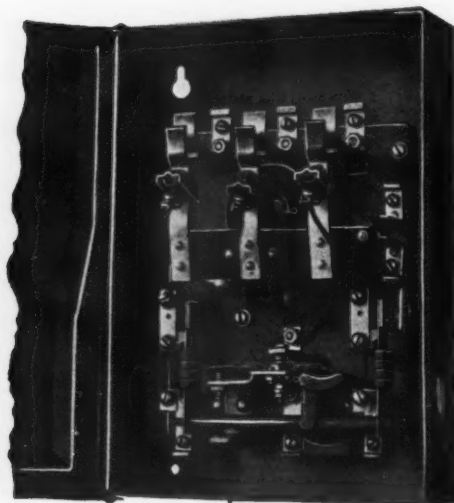
PENN., PA.

Huntington, W. Va.—Huntington Supply & Equipment Co.
Clarksburg, W. Va.—Mr. Norman Strugnell.

Long Distance Phone—Jeannette 700.

Knoxville, Tenn.—Webster & Company.

Chicago, Ill.—W. W. Baker, 140 So. Dearborn St.



Announcing the NEWEST LINESTARTER

for
Motors Up to 5 HP.

WITH this latest addition to its LINESTARTER family, Westinghouse now offers a more complete and less expensive line of starters for all industrial drives. The newest LINESTARTER is an extremely simple and economical device for starting motors up to 5 hp. directly across the line. It also retains all the desirable characteristics of the other LINESTARTERS for motors of greater horsepower. This is especially true in the construction of the relay.

Another noteworthy feature is that it can be arranged for either hand or automatic reset of the relay. It can be universally applied with any kind of master switch.

Merely push the button and the LINESTARTER functions—the motor starts and the machine is in

operation. When a sustained overload occurs—when the motor windings become overheated—the thermostatic metal responds to the heat and trips the relay, thereby preventing damage to the motor.

Long life is a feature of this LINESTARTER. Even though the motor is started and stopped hundreds of times a day, the contactor ruptures the arc so quickly that burning and wear of the contacts take place very slowly. Because of its small size, the LINESTARTER can be mounted in out-of-way places, and every part is readily accessible. The entire design is neat and attractive, all the metal parts being cadmium or tin plated.

The LINESTARTER and LINESTART motor provide a simple, efficient and economical combination for industrial drives.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Sales Offices in All Principal Cities of
the United States and Foreign Countries

The LINESTART Motors

These motors can be started directly across the line, which means a simple and economical combination.



Torques

Supplied with either a starting torque which compares with the standard squirrel cage motor, or with a starting torque of two to two and one-quarter times full load torque.

Double Impregnated Windings

The windings are given double impregnation which not only retains their flexibility, but make them moisture-resisting and proof against abrasive dust and dirt.

Sealed Sleeve Bearings

Equipped with Sealed Sleeve bearing, these motors assure consistent performance under all conditions. So effectively has this bearing been sealed that oil cannot escape and reach the windings, nor can dust or grit get into the bearing.

Westinghouse

K96532-

How One Company Gets Clean Coal



An 18-inch Band of Rock and
Rash Swept out by the
Powerful Reverse Sweep
of the Cutter Arm and Chain

No Jacks to Set
No Ropes to Change

Just a turn of the reverse handle on the controller does the trick

This convenient and instant reverse action is of advantage in all situations, and is of special value in cutting and removing a thick parting of rock and rash which separates from the upper coal and settles into the kerf, forming a loose mass of "dirt."

The reverse swing of the cutter arm—its chain also in reverse motion—quickly and effectively sweeps the whole mass of dirt out onto the mine bottom, for easy disposal, leaving the coal itself ready for shooting and loading out, perfectly clean and with no fines due to the cutting or to heavy shooting.

A 50-hp. Goodman Slabber fairly buried in rock and rash which it has cut on a feed swing and then swept out on a reverse swing of the cutter arm. While apparently buried, its turntable platform keeps the track wheels clear, so the machine can travel to the left along the face, stopping every six feet for a forward cut and a backward sweep.

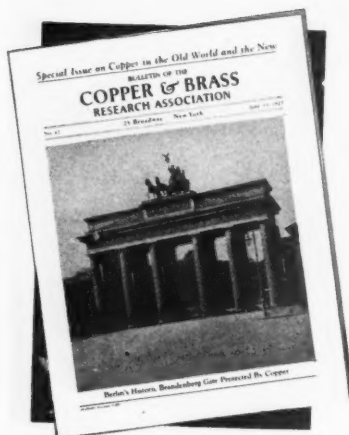
It will pay you to Investigate Closely the Operating Features of the

Goodman Slabbing Machine

Every Part Built by Goodman—Builder of Coal Cutting Machines for 40 Years

GOODMAN ⁽⁶⁸⁾ **MANUFACTURING COMPANY**
HALSTED ST. at 48TH
CHICAGO --- ILL.
Locomotives - Loaders - Coal Cutters
PITTSBURGH - CHARLESTON, W. VA. - HUNTINGTON, W. VA. - CINCINNATI - BIRMINGHAM - ST. LOUIS - DENVER - PRICE, UTAH

Increasing the use of Copper and its alloys—



If you are not on the bulletin mailing list we will be glad to add your name without cost.

THE Copper & Brass Research Association is composed of all the larger copper producing companies and brass fabricators. Its principal function is to increase the use of Copper, Brass and Bronze through advertising and research work.

Millions of advertising messages are published annually in the daily newspapers, national magazines and in the trade and technical press. These messages set forth the quality and durability of Copper and its alloys in the respective fields to which they are best suited.

The technical staff of the association investigates new and existing uses of Copper and Copper products. It advises on the use of the metals and assists in solving problems of a technical nature that confront builders and manufacturers.

Members of the

COPPER & BRASS

RESEARCH ASSOCIATION

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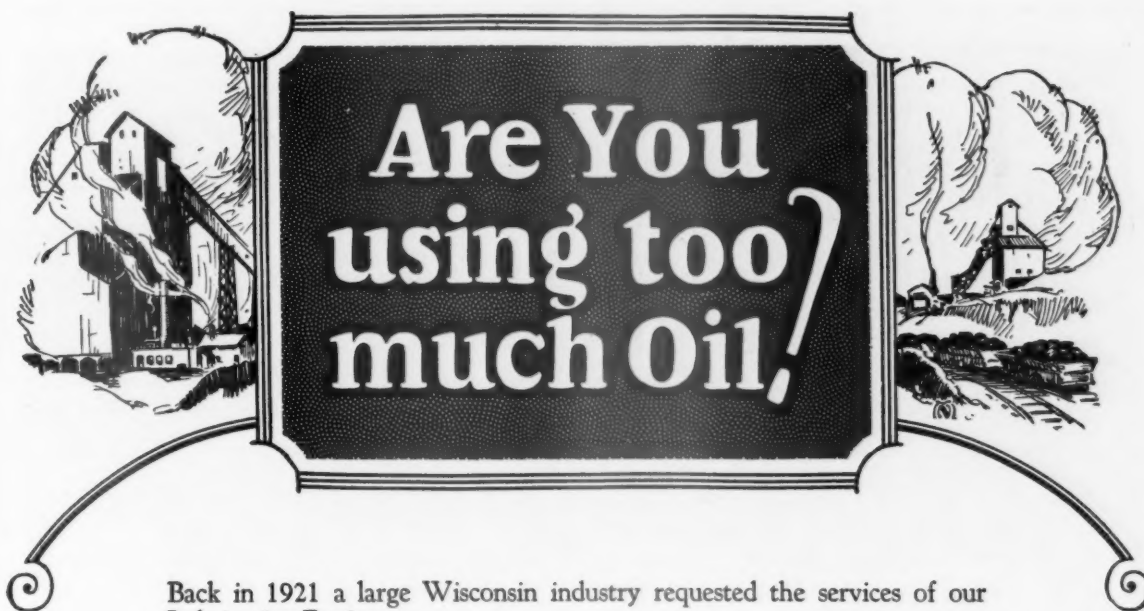
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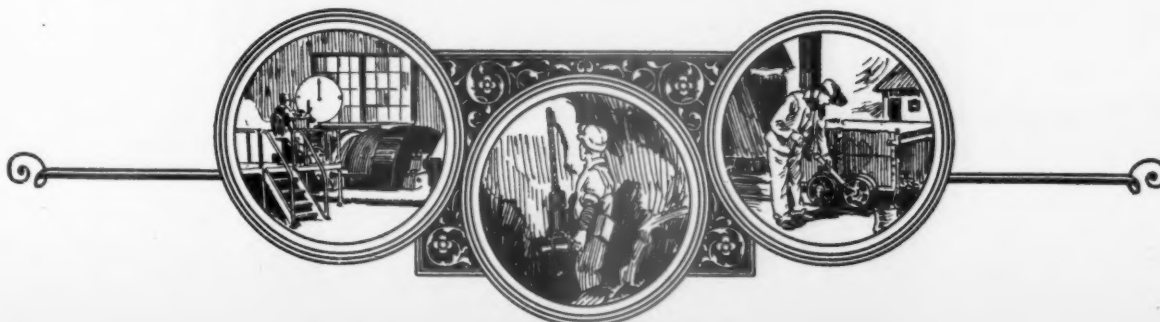
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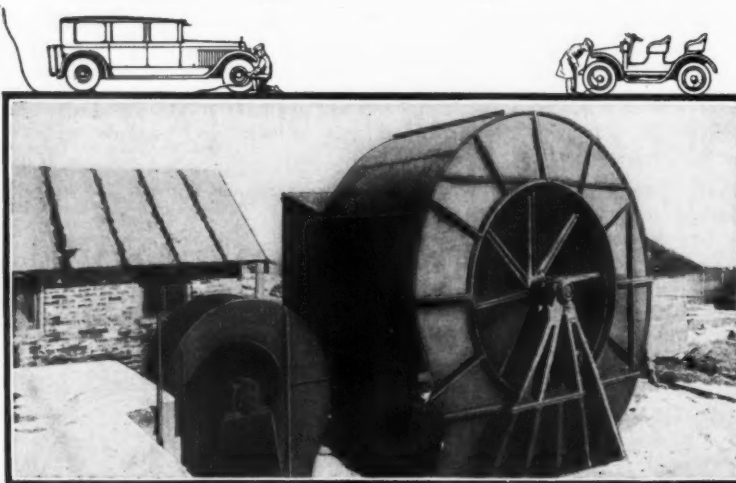
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THE AMERICAN MINING CONGRESS covers a large field. While it represents the mining industry as a whole—87 percent to the total mineral production of the United States—it represents equally the individual units of that industry. It differs distinctly from the ordinary trade association in that it has made itself the

THE FUNCTION OF A GREAT ORGANIZATION

clearing house for mining information. It originates, compiles and disseminates facts concerning mineral production, and mining economies. It at no time attempts to tell the industry or the Government what to do. It furnishes the facts to industry and legislator alike, and bases all of its recommendations upon these facts. The Congress of the United States has and does frequently avail itself of the services of this organization.

Its recommendations are founded upon no partisan propaganda, but upon the solid rock of necessity supported by incontrovertible facts. Its position is that Congress, under the Constitution, is charged with the responsibility for all legislation and that it is not within the province of any organization to undertake to usurp that responsibility by undue pressure upon the members of Congress, but that the legitimate function of such an organization is fully carried out when it furnishes to the members of Congress the information required by them for an intelligent consideration of the subject. The same theory prevails as to the administration officials who desire information as to public sentiment upon any matter in which a question appears.

That the Government may learn first hand of the work of the organization, that the leaders in Government may meet personally the leaders in the mining industry, the conventions of the American Mining Congress include both upon their program.

Friction can not arise from understanding. And there is great need for more complete understanding between the legislative branch of our Government and the industries they are attempting to serve. Understanding is arrived at more quickly through personal contact than in any other manner. These conventions offer a tremendous opportunity to advance the "Understanding Business" and to establish a broad spirit of cooperation.

THE PROCEEDINGS of the Thirtieth Annual Convention of the American Mining Congress will furnish remarkable material for the "Mining Log" for future generations.

A MATTER FOR CONGRATULATION

The program is of outstanding importance and interest. Modification of the Sherman Law rubs shoulders with Mine Mechanization; Legislative Problems marshal themselves alongside the woes of Centralized Government, Taxation and the

Public Lands; Standardization and Federal Control of Industry and an opportunity to learn *en masse* and first hand, concerning the activities of important Government bureaus, lend an appeal only surpassed by the group of men who will present them.

The American Mining Congress should be extended hearty congratulations upon assembling this array of chief executives, department heads, transportation and legal talent, and leaders in economic thought, who will gather for the common good to discuss how best our marvelous industrial leadership may continue to advance our high standards.

A great program, and a history-making event.

UNIQUE IN THE PROGRAM for the convention is the arrangement which permits the heads and division chiefs of the United States Bureau of Mines, the Geological Survey and the Bureau of Internal Revenue to present their work, and informally discuss their activities in behalf of the mining industry.

AN UNUSUAL OPPORTUNITY

This opportunity, which enables the mine operator and the Government representatives to discuss their mutual problems, should go far towards bringing about a better understanding of what the industry needs and what the Government is prepared to give.

AMONG THE INTERESTING SUBJECTS up for discussion at the convention is "The Economic Importance of Mining," which will be presented by the Hon. Herbert Hoover, the Exhibit A of the industry.

THE KEystone OF INDUSTRY

It is well to remember that mining is something more than a series of labor disputes or an over-producing industrial unit, and that however important it is as a producer of sand and gravel, clays and limestone, coal and copper, lead and zinc, gold and silver, all important to our happiness, it is also a gigantic factor in transportation, furnishing more than half the raw material hauled by the railroads. It is an enormous source of taxation, contributing magnificently to our national coffers. It utilizes thousands of workmen and must be considered when immigration is discussed. It is the great source of our national wealth.

To handle this industrial giant in such a manner as will produce the greatest benefits to our country and present-day civilization, with an eye to the generations to come, is a task that is worthy of the greatest intellects, the understanding sympathy of the administration, and the unselfish cooperation of the entire industry.

DURING ALL OF THE YEARS of the great industrial prosperity of this country the farmer has been the bulwark of the protective tariff. Efforts to mislead him by the charge that the manufacturing interests were the sole or principal beneficiaries of tariff protection have at times temporarily weakened his spirit, particularly during times of farm depression, but on the whole he has been, as in the future he will be, the principal supporter of the protective theory and its ultimate beneficiary.

THE TARIFF AND THE FARMER

The farmer knows that all his product can be sold better in a home market and that most of his product must be sold in a nearby market if at all. The farmer knows that the nearer he lives to a large manufacturing center the more he gets for his farm products, which in turn makes his land more valuable and in every way makes possible his prosperity.

He knows that in all sections of the country the value of farm lands depends very largely upon their distance from a center of population. The farmer in the great southern belt of the country knows that an acre of his land will produce as much in a single crop as the best land situated within fifty miles of the city of Chicago. He knows that frequently he may produce two or three crops in a season. He knows that the equable climate enables him to feed his stock on pasture many months during which his fellow farmer in Illinois must feed his stock from husbanded crops. Notwithstanding all of these advantages, he knows that while his farm lands are worth from \$25 to \$50 an acre, that the less productive land within fifty to a hundred miles of Chicago is worth from \$250 to \$500 per acre, and he knows further that the owners of this high-priced land find it possible to pay operating expenses and earn an interest rate upon the invested capital much more easily than he can do with the lower priced land.

The farmer knows that the great eating population with its high earning power is made possible in the industrial center by the protective tariff which shuts out of the home market the manufactured goods produced by foreign labor at a greatly reduced wage scale; knowing these things, he will not be misled by the utterances coming from high-sounding committees, whose conclusions are based entirely upon theory, and whose investigations do not go far enough to develop the fact that what the farmer needs is a net return from his product which will enable him to buy the products of high-priced labor, which in turn is the market, and the only market, in which he may sell his product at a profit.

The recent report of a committee appointed by the United States Chamber of Commerce and the National Industrial Conference Board to the effect "the steady extension of tariff protection to the manufacturing industries and the increase in the tariff level in post war years have tended to increase the difficulties of American agriculture," indicates that this committee did not give proper consideration to the indirect benefit to the farmer of the great home markets created by protected mining and manufacturing industries. It is not even true, as stated by the committee, "that the enormous increase in governmental and private foreign indebtedness to the United States has compelled the debtor nations to reduce their imports, increase their exports, and become more self-sufficient in respect to agricultural products." The fact is that our exports of agricultural products for the five years ending in 1925 averaged \$2,093,987,000, while the exports for 1925 were \$2,280,165,000. Our imports of agricultural products

during the same five years averaged \$1,732,230,000, while the imports for the year 1925 were \$1,817,473,000. The necessities of foreign peoples to find outside markets in order to earn the money with which to meet their foreign obligations have undoubtedly intensified the competition in the world markets, but just to the extent by which competition is increased will the farmer call for an increase of tariff levels in order that his home market may be preserved.

The farmer and the miner have a common cause and a particularly close relation, because the mining camp furnishes the only possible local market for large agricultural areas against which the tariff of distance is necessarily and continuously operative.

GOVERNMENT IN BUSINESS has been the slogan of two administrations, the Harding campaign using as its high light "More Business in Government, less Government in Business." The present administration has again and again expressed itself as against any Government competition with private enterprise. Notwithstanding the

GOVERNMENT COMPETITION

admitted policy of those at the head of our Government, there has been no lessening in the tendency of the Federal power to wish to do many things that the states and the people are perfectly able to do for themselves.

We have repeatedly gone on record against Government in business. Our position has been that the Government ought not to enter into any business which can be developed by private initiative; that the governmental function ends when it has created conditions under which private citizens may undertake a business enterprise. President Coolidge ably stated our views in his recent address before the Union League Club in Philadelphia when he said, "When the Government enters a business it must occupy the field alone. No one can compete with it—the result is a paralyzing monopoly."

WITH A GRAND FLOURISH Mr. John L. Lewis of the United Mine Workers of America descends upon

WITH A FLOURISH

Washington, and the President of the United States, in a big effort to focus public attention, and perhaps sympathy, upon the condition in the recently reopened districts that have gone "non-union," and the disgruntled union ex-employees in the Pittsburgh field.

Just what will he gain? The so-called yellow press will publish a lot of sob stuff about poor-little-hungry-frozen children, and will photograph the ousted miners living in miserable barracks, and shout "all for a principle."

To use one of Will Rogers' classics: "No matter how thin or how thick you slice it, it's still bologna."

These workers have not been ousted. They are living as they are from choice. They were offered good jobs at fair wages, and refused to accept. After negotiating for months, and failing to come to an agreement which would permit the operation of the mines, the companies involved, and particularly the Pittsburgh Coal Company, resumed operation on an open-shop basis. In other words, failing to get their old employees back, they offered their jobs to men who would take them.

If there is suffering in the union ranks, surely they have only themselves to blame for it.

" * * * THE ANTHRACITE INDUSTRY is not a Christmas tree for the distribution of largesse

NOT A
SANTA CLAUS

by a financial Santa Claus, but a tree planted in the soil whose life, growth and fruit-producing quality will continue only so long as it is given constant care and fertilization * * *

The above statement emanates from the very heart of the anthracite industry—an industry that has withstood wicked assaults upon its resources, an industry that is battle-scarred, an industry that has had to fight every step of the way.

For many years there was a deep conviction that the term "fuel monopoly" applied to anthracite. The people in the anthracite district began to believe it. They seemed to feel that the Santa Claus theory should be tried out and so the workers struck for greater pay and the populace approved. In the long drawn-out battle they learned among other things that there isn't any Santa Claus and that some people—a great number of them—were satisfied with bituminous coal and oil as fuels. Away flew the fuel monopoly idea, and left a cold, deserted, and unhappy hearth.

Anthracite production fell off alarmingly, taxes based on the Santa Claus and monopoly theories piled higher and higher, until disaster loomed on the horizon of those dependent upon the industry.

So those who had so cheerfully gone about wrecking the industry cast about for a means to undo their work. They called a convention at Mount Carmel and Secretary of Commerce Hoover and Governor Fisher and prominent operators participated—all in the effort to undo the harm the myth had created.

It is a costly lesson, but if it will serve to point out the viciousness of the strike, the unfairness of discriminatory taxation, the need for cooperative effort and loyalty to the industry, it will not have been in vain.

The coal region people now realize what it means not to receive their proportion of the \$475,000,000 which is the approximate value of annual production.

To quote E. W. Parker:

"When reason returns to its throne and the state tonnage tax is repealed; when counties and municipalities discontinue sucking the lifeblood from the industry, and when labor returns a *quid pro quo* for the high wages it is paid, the struggle to make both ends meet, and to maintain anthracite as the premier domestic fuel, will have to some extent been won."

THE JOINT CONGRESSIONAL COMMITTEE on Internal Revenue Taxation has made a report to

A CONSTRUCTIVE
REPORT

the Ways and Means Committee of the House of Representatives and the Finance Committee of the Senate that deserves analysis and commendation. While this report does not offer a complete program for legislation, it

recommends important steps that may be taken at this time to ameliorate the difficulties of the present system of income tax administration. It proposes, first, simplification of underlying principles; second, simplification of the arrangement, phraseology and other matters of form, of the provisions of the revenue law.

A complete rearrangement of the law is recommended, a principal feature of which is that all provisions of

general interest to taxpayers are collected in 16 pages at the beginning of the act. Typographical improvements, such as the use of varied types in printing the law, catchwords, headnotes, indentations, and the like, simplifying the form of the statute, are incorporated in the proposed rearrangement. Administrative provisions are compiled in the form of a code. And the report states that simplification, uniformity, and other advantages will result from this compilation; but that simplification of form alone will not afford an adequate measure of relief, and, therefore, a thorough reexamination of the entire statute is being made for the purpose of developing simpler basic policies—the fundamental need in statutory simplification.

To meet the need for simplified administration, the report recommends: (1) Consolidation of the offices of the collectors of internal revenue and the offices of the internal-revenue agents; (2) that in the future all employees of the Bureau of Internal Revenue be required to enter through the medium of the civil service; (3) better legal advice to taxpayers to be provided by the collectors' offices; (4) simpler forms of returns. Legislation is required to accomplish these recommendations. Consolidation of the offices of collectors and field revenue agents, to avoid duplications of work and to effect economies in administration doubtless will meet the general approval of taxpayers. In fact, these recommendations are in line with suggestions made in response to the American Mining Congress questionnaire, referred to in an article appearing in this issue.

The Joint Committee appears to be doing well what was expected of it. It should be continued until its work is completed. It has been striving for results that will benefit the taxpayer as well as the Government. It has given careful consideration to the complaints, grievances, and difficulties of the taxpayer, and intensive study to problems of administration presented by the Bureau of Internal Revenue; and is attempting to strike a proper balance. Its efforts are wholly constructive, and the report just issued is a fair indication of other constructive recommendations to follow as its investigation proceeds.

THE NEWLY ORGANIZED COPPER INSTITUTE has filed with the Federal Trade Commission its constitution, by-laws and resolutions regarding functions. In

THE COPPER
INSTITUTE

their announcement they state that "the object of the Institute shall be to aid the copper industry through wider knowledge and clearer understanding of the economic factors affecting the production, manufacture, distribution and consumption of copper and copper products." Chief among its activities will be the collection, compilation, dissemination and publication of accurate information concerning copper and the industrial and commercial conditions bearing upon production, distribution, marketing; the formation of a standard system of accounting, the adoption of fair trade usages and practices; and the employment of all lawful means to better the industry.

All of this is exceedingly laudable, and should be of vast assistance to the copper industry which for the past few years has been dec'dedly in the doldrums.

IT WAS WITH CONSIDERABLE SURPRISE, if not alarm, that we recently saw a statement to the effect that there are in existence some two hundred standardizing bodies in this country, all working to the same end, uncoordinatedly, and with little regard for the activities of each other, if in fact, they know about them.

STANDARDIZE STANDARDIZATION

The fact that these two hundred agencies are working without each other's knowledge is not particularly surprising. It is the fact that they do exist that is the surprise.

The Standardization Division of the American Mining Congress began its activities eight years ago; it has plied its trade diligently. The Division has accomplished much, having to its credit four full standards, eight completed but as yet unlabeled standards, and has in the making thirteen additional embryo standards.

In all this mass of simplification and standardization there has been but one rough spot. None of these standards was arrived at without tribulation, but upon one only did the hornets' nest descend. Coal Mine Ventilation, with its recommendations concerning booster fans, was the rock which split the harmony. A great furore developed on this report, with some misunderstanding and a little hurt pride.

Whatever the result of the final disposition of the report, one real tragedy has occurred. The three great agencies for the mining industry—the Bureau of Mines, the American Mining Congress, and the Institute—are agreeing to disagree! The Bureau of Mines has refused to play, and the American Institute feels that an engineering standard is "different" from an operator's standard, and that the Bureau of Mines should develop its standards, the Institute its standards and the American Mining Congress its standards and that industry shall take its choice from among them!

The American Mining Congress steadfastly maintains that any standard that does not represent the engineer, the manufacturer, the operator and the Government is not a standard. It is merely a recommendation.

Where is the agency that is big enough to coordinate and standardize standardization not only for the mining industry but for each of the other agencies—those other two hundred?

The only properly designated agencies now are those known as the *American Engineering Standards Committee*, and the simplification activities of the Department of Commerce. The former should be the agency. Governmental interference or dictation would not set well with industry. But what of the American Engineering Standards Committee?

For the past year or two there has been much discussion among the member bodies of this committee regarding the "Methods of Work" and the "Rules of Procedure." Out of this discussion there has been advanced many suggestions with the object of improving and expediting its work. Some of the plans advanced extend to an entire reorganization of the committee. It is apparent to anyone who has followed this discussion that there is such a variance of opinion regarding how to reorganize or improve this committee, that it will be a considerable length of time before the member bodies

with their diverse interests will reach any conclusion. It should be evident to anyone interested in industrial standardization, which has been directed for several years by the American Engineering Standards Committee, that all this discussion of the reorganization of this committee will injure its prestige.

It is no exaggeration to say that this committee is at present in a most chaotic state, and that it is of the utmost importance that a decision should be reached at an early date as to whether it is properly organized, or whether it must be reorganized and, if so, how such reorganization can be effected to the best interests of all.

A volume could be written on the subject of the baneful influence of over-centralization in our democratic form of government. On the broad general principles involved, therefore, we are unalterably opposed to the suggestion of placing industrial standardization in this country under any branch of our Federal Government.

The American Engineering Standards Committee represents thirty-two of the two hundred agencies, a large proportion of the remainder being Government projects. Surely these thirty-two organizations can get together and eliminate the present menace to standardization by giving to Doctor Agnew their moral, financial and "shirt-sleeve" cooperation.

It is up to the mining industry to clear its own atmosphere. The misunderstanding is too patently personality rather than policy. The mining industry does not want Government rules and regulations poked down its throat, but it will get them, even if it chokes it, unless it simplifies its own problem.

The great heterogeneous mass called standards, meantime, stews in its own juice and awaits the coming of a Moses who will paint such a vivid picture of co-operation that following will be easier than resisting.

OLD NOAH WEBSTER and those who have tried to out-Webster him have invented a considerable array of definitions to make us understand that little word "co-operation," but it remained for the worthy Chairman of the Manufacturers Division of the American Mining Congress, Mr. H. K. Porter, to properly classify its real worth. "Shirt-sleeve" cooperation is what he terms the service rendered the mining industry by the Manufacturers Division.

"Shirt-sleeve"—the kind of cooperation that takes off its coat and says, "Now, boys, what's your problem?" and to the best of its ability, power and sweat, helps scale the mountain or plumb the depths of old Mother Earth.

Certainly the Division has earned Mr. Porter's praise. Where before the flower of cooperation bloomed not in the mining field, today there is a splendid garden of the finest blossoms.

Through this Division, the operator has been brought the best engineering skill, and the manufacturer has learned first hand what he could do to help.

A real working organization—the Manufacturers Division. All power to "Shirt-Sleeve Cooperation!"

SHIRT-SLEEVE HELP

BLOODSHED HAS AGAIN RESULTED through an I. W. W. strike in the coal fields of Colorado. Under the influence and intimidation of the Industrial Workers of the World, the miners went on strike on October 19. History tells an amazing story of labor conditions in coal production in Colorado.

**ANOTHER I. W. W.
CRIME**

For a number of years the Rockefeller Plan of Industrial Relations has held a high place in the industrial field. Under this plan the workers have been surrounded with excellent working conditions, good homes, and splendid recreation centers. Everything has been done to develop, educate, and give the worker a place in the sun. The wages paid have been above the average for this class of work, and in all it is difficult to find a legitimate reason for the strike.

The I. W. W. has been the outlaw of the West. Composed largely of the foreign element, over-ridden with bolshevism, at best a disturber of conditions, this agency has done much harm to western industry and business, has many crimes at its door, and no excuse for its existence.

The acute situation which recently arose was to be expected. The mine owners established guards at their properties to prevent destruction and the molestation by the strikers of those workers who chose to remain. When the company was no longer able to protect itself with these guards, the state was called upon for aid to preserve peace, and the National Guard was sent out. The strikers continued their assault to the extent of wounding some of the guards. When it became apparent that nothing short of desperate measures would stop them, and after the guards had fired a volley into the air, the guards fired a second volley directly into the advancing group, and several were killed and a number wounded.

It is a well-known fact that not more than forty percent of the people employed in the Colorado coal fields are in any way involved in this strike. At least 60 percent wished to continue work. They were intimidated, by threat of violence, until fear is the ruling factor. Miners in the central field continued work after the first I. W. W. action elsewhere, but with the arrival of a hundred and thirty-five automobile loads of miners from other parts of the state, they decided to add their number to the striking miners.

The situation calls for determined action on the part of the State of Colorado, and the mine operators and the state should have the whole-hearted cooperation of the American people in giving this dangerous organization the complete lesson coming to it, and effectually eradicate it from our industrial life.

ACCORDING TO A RECENT STATEMENT, Representative S. S. Arentz, of Nevada, is dissatisfied with the status of the House Mines and Mining Committee. Mr. Arentz believes that this committee ranks in importance with the major committees of the House and feels strongly that it should not be relegated to a minor place in the scheme of things on the Hill.

**THE
HOUSE MINES
COMMITTEE**

We agree with the Representative. All important legislation affecting mining originating in the House should be referred to this committee. The industry will be behind Mr. Arentz in his efforts.

THE MECHANIZATION SURVEY which was started about the first of this year has now progressed to the point where it is beginning to show a fairly representative cross section of this newest development in the art of mining coal. Mining operations that have been included in this survey are located in eleven different

**A YEAR'S
INVESTIGATION**

states, extending from Pennsylvania on the north and east, through the central states to Utah and New Mexico on the west, and as far as Alabama on the south. A total of 56 mechanized mines have been visited; of these, 46 are considered by the company officials as successful operations and 10 are experimental or have not yet been developed and systematized to the point where a report or a description would be of much interest.

These 46 operations include 26 mechanical loaders, 12 conveyors and 8 scrapers. All the mines which are using or developing mechanization have not yet been visited, so this survey is not a census in any degree, and it is by no means certain that it shows the correct proportion in which the three types of equipment have been installed. Furthermore, these reports simply describe the mining systems and the methods of operation and do not show the number of machine installations operating at each mine which was visited. No attempt, therefore, has as yet been made to present compilations of figures from which conclusions might be drawn, but a number of striking and outstanding facts are in plain view.

These facts, as shown by the survey, are that mechanization is not confined to any one coal field or to any one set of mining conditions or market requirements. It is true that under the more favorable mining conditions the development and success of mechanization has been more easily and more rapidly attained, but this has not prevented the installation and successful operation of mechanical equipment in mines where conditions are very severe. The further fact that mechanization is now commanding the serious attention of mining men in every coal field is evidenced by the widespread interest which has been manifested in this survey.

THE TREND OF STATE LEGISLATION is toward mine safety and taxation of natural resources.

**THE
TREND OF STATE
LEGISLATION**

In this issue we show that during the current year twelve safety measures and nine tax measures were enacted into law. Two of the safety measures provide for rock dusting, others for regulation of underground mining in the interest of safety. The tax measures include license fees on the sale of ore, gross production tax, mineral title tax and severance tax. Other legislation included measures providing for an eight-hour day and regulation of oil well drilling.

The review above referred to shows conclusively that the political view of necessary legislation is more safety laws and greater tax return to the state from natural resource industries.

NOTES on the MODERN SILVER QUESTION

By W. MONT FERRY *

WITHIN the last few years a good deal of investigation has been made by those interested of the so-called silver question with a view of determining, not only the present, but the future status of the white metal and the practical effect of this status upon silver mining operations.

These investigations have resulted in the accumulation of a vast amount of information which, while not entirely convincing, is nevertheless of great importance, not only to the silver mining industry but to other and larger interests as well.

It should be remembered that silver is not a mere commodity. It is as well a money metal, used by hundreds of millions of people from time immemorial. Therefore the same methods of investigation, argument, and conclusion that apply to commodities will not work when applied to silver. Furthermore, the fact that silver is practically indestructible adds an additional complication to the subject.

Having the foregoing in mind, it is obvious that a consideration of this perplexing question leads the investigator into fields where angels fear to tread.

These brief comments will be confined to the situation in which the silver miner finds himself in the present days of low market price for his silver and high cost of production.

In the production of the metal the silver miner, as such, finds himself less important than used to be the case. Now he produces about one-third of the annual production of silver while copper miners produce another third and the various combinations of lead-zinc miners account for the remainder.

The copper miner and the lead and zinc miner produce silver more or less as a by-product, and may if they choose charge all of their costs against the base metals, regarding their receipts from the sale of silver as velvet. On the other



After Considerable Investigation The Silver Industry Finds Itself In The Same Serious Situation It Has Faced For The Past Few Years—Increased Uses In The Arts And The Continuing Hope That The White Metal Will Play Part In Financial Systems Of Civilization Is Basis For Future

hand, the silver miner must charge all of his expenses to silver alone, and at the present market for his product he is indeed facing a serious situation.

It does not seem likely that any material increase in the market price of the white metal can be anticipated in the immediate future. On the other hand, it does not appear to be probable that any material reduction in price need be feared. This last opinion is expressed with hesitation. A number of unexpected blows have fallen on silver within the last two or three years, and it is, of course, possible that other unexpected

blows may follow. Silver has withstood these blows in a manner that is little short of being marvelous and the market has stabilized itself in a comparatively short time. It is not unreasonable to feel that the present market price will prevail in the immediate future with a tendency

toward a higher level.

The arts and industries are consuming more and more silver. An intelligent and persistent effort is being made to increase that consumption. But silver after all is essentially a money metal, and 60 percent of its annual production finds its way into the channels of business as money, both primary and subsidiary.

It is after all the hope and belief that more silver will be used as money that causes many to believe in the future of the white metal. Economists and financiers of international reputation have expressed a conviction that the economic burden upon gold was becoming unbearable and that some time in the not too distant future an international conference would give this matter serious consideration. Bi-metalism is dead, at least for the present, but it is entirely probable that silver may be called upon to play an honorable part in the financial systems of civilization.

SILVER PRODUCERS' SUIT TO BE TRIED SOON

Trial in the District of Columbia Supreme Court of the suit of the American Silver Producers Association to compel the Government to purchase 15,000,000 ounces of silver at \$1 per ounce to complete purchases under the Pittman Act is not likely to be held until January or later. Attorneys for the Government have declined to enter into a stipulation of facts in the case which was proposed by attorneys for the silver interests and which would have narrowed the trial to a few points. The silver association attorneys are now preparing a plea to the Government's answer to the suit. The case will then go to trial on all of the issues involved.



W. Mont Ferry

* President, Silver King Coalition Mines Co., Salt Lake City, Utah.
(Photograph—Silver King Mine, Boutwell, U. S. Geol. Sur.)

AMERICAN MINING CONGRESS in ANNUAL CONVENTION

Extraordinarily Fine Program Announced For Thirtieth Annual Meeting Of Organization— Cabinet Members, Senators, And Members Of The House Participating In Discussions—Bu- reau Of Mines, Geological Survey And Revenue Department Each Will Present Work

THE Thirtieth Annual Convention of The American Mining Congress will be one of outstanding importance, with a brilliant array of speakers, and topics of timely interest. The convention will convene on Thursday morning, December 1, at the Hotel Mayflower, at Washington, D. C., and will continue through the second and third.

William H. Lindsey, President of the Congress, will open the convention with an address on "Mining the Keystone of Industry," and will advance a program for the industry as visualized by the organization.

Each session is of major importance, with the men participating leaders in official Washington life, and in the mining field. The meeting is divided into eight sessions, as follows: "Mining the Keystone of Industry," "Legislating for Natural Resources," "States' Rights, Individual Initiative and Centralized Government," "Modifying the Anti-trust Law," "Mine Mechanization," "Taxation," "Progress in Mining" and "Progress in Standardization."

Unique in this convention is the arrangement which permits the heads and chiefs of divisions of the important Government agencies, the United States Bureau of Mines, the United States Geological Survey, the Bureau of Internal Revenue, to present their work, and informally discuss their activities in behalf of the mining industry. This opportunity for the mine operator and the Government's representatives to discuss their mutual problems should go far toward bringing about a better understanding of the problems of the industry by these agencies, and a better understanding of what the Government bureaus are attempting to do for the industry.

"The Economic Importance of Mining to the Nation," is the title of the paper to be presented by the Secretary of Commerce, the Hon. Herbert Hoover. Mr. Hoover needs no introduction and it is needless to say that his message will be of the greatest interest not only to the mining industry, but to the country at large.

Because of the growing number of organizations both national and local, and the necessary duplication of effort, due to inability of each to know what the activities of the others are, it is becoming increasingly important that all natural resource industries work in unity, to achieve the greatest amount of good

from the work being done in their behalf. "A Plea for Unity in Natural Resource Industries," is the title of the paper to be presented by Sidney J. Jennings, vice-president, U. S. Smelting, Refining and Mining Co. What Mr. Jennings has to say on this important subject, in the constantly growing age of the "trade association," should be of genuine interest to the industries supporting the organizations, to the organizations themselves who have the best interest of the industry and the operators at heart, and to the general mining public.

The Congress of the United States will convene shortly after the close of this convention. It is anticipated that a considerable number of bills will be introduced that have direct interest to mining. Senator Tasker L. Oddie, chairman of the Mines and Mining Committee of the Senate is in a position to give authoritative information on "What is on The Legislative Calendar for Mining." He will tell delegates his idea of what the industry may hope for in the way of legislation at the next Congress, at the second session of the convention, when the general topic for discussion is "Legislating for Natural Resources." Mr. J. G. Bradley, president Elk River Coal and Lumber Co., Dundon, W. Va., will preside at this session, which will also have as a major feature "The Bureau of

Mines Hour," the first of the series of three hours arranged for Government agencies.

For the past several years there has been an epidemic of congressional "investigations." What has been their value?

Have they been helpful or detrimental to prosperity generally, and have they accomplished the purpose for which they were inaugurated? Senator Frank R. Gooding, of Idaho, will discuss this interesting subject, one in which the mining industry has an especial interest.

Centralized Government has been a theme upon which volumes have been spoken and written. Perhaps this subject received its public debut with the Harding Administration, which was founded on "Less Government in Business; More Business in Government." And as Mark Twain said about the weather, "Everybody is always talking about it, but nobody doing anything about it" applies with force to this subject, and it is time, so far as mining is concerned, that an inventory be made. Hon. James E. Watson, United States Senator from Indiana, will present his view on "Growing Tendency Toward Centralization of Government," and A. Cressy Morrison will present "International Centralization as suggested by the Geneva Conference." These two papers are of great importance to the mining industry.

Industry, particularly the mining industry, has had continuously held over its head the sceptre of Federal control. A battle cry of the past 10 years has been Federal control. At every so-called misdemeanor of industry the threat of Government confiscation has been held over its head. Bills have been introduced in Congress authorizing the "Government" to run this and that industry. What are the chances of such legislation actually becoming a statute? The Hon. Phillip P. Campbell, former United States Congressman from Kansas, will discuss this subject, and his message will be listened to with intense interest.

The public lands question will have its inning. Both the Government and the western public-land states will be heard. Is the leasing system the right manner in which to dispose of our mineral holdings, and are the public-lands states satisfied with the present policy? This discussion should clear the atmosphere in this respect.

Hydro-Power as a Natural Resource will be presented by the Hon. Lewis W. Douglas, newly elected Congressman





Mayflower Hotel, Convention Headquarters

from Arizona. Coming from a distinctly mining state, Mr. Douglas' views will be important and interesting.

Stabilization of Industry, which some feel can only be achieved through Modification of the Anti-Trust Law, is a subject in which all producers of natural resources are interested deeply. A great many feel that modification of the Sherman law to permit cooperative effort in the coal, zinc, copper and oil industries is the open door to their salvation. Others are of the opinion that tampering with this law will not solve the need, and ask pertinently what will take its place if declared void. One entire session of the convention will discuss this important subject. G. H. Montague will open the session with a discussion of "Lawful Combinations in Industry," wherein he will show how the law has already been modified to meet the needs of other industries, and show how it may be modified to apply to mining's problems. Assistant Attorney General William J. Donovan will discuss "Is the Modification of the Sherman Law in the Public Interest." Walter Gordon Merritt, counsel, Anthracite Operators' Conference, will discuss "Will Modification of the Sherman Law Solve Coal's Largest Problem," and "The Zinc Industry and the Sherman Law" will be presented by A. Scott Thompson, attorney at law, Miami, Okla. This program and this session are of special significance to the

mining industry, and should be extremely helpful in solving the problems of the industry.

The major problem before the coming



Congress is tax reduction. Admittedly a great portion of this session will be devoted to considering ways and means for reducing the taxpayers' burden. Therefore the Saturday morning session of this convention will be of vast interest to the mining industry, in that the entire program will be devoted to "Mine Taxation." An interesting feature of the program will be the "Revenue Hour," which will be used by engineers and accountants of the Bureau of Internal Revenue for discussion of general and practical administrative problems involved in valuing mines and auditing returns of mining taxpayers. S. P. Hatchett, chief of the Engineering Division, Bureau of Internal Revenue, will preside.

Among the important phases of the tax subject the following will be discussed: "Organization, Practice and Procedure of the Bureau of Internal Revenue," by Robert N. Miller, Miller & Chevalier; "What the Taxpayer Expects in a New Tax Law," by H. B. Fernald, Loomis, Suffern & Fernald; "Progress of Studies of the Federal Revenue System Being Made by the Joint Congressional Committee," by Charles D. Hamel, counsel, Joint Committee on Internal Revenue Taxation; and "A Comparative Study of Mining and Other Industrial Enterprises from a Taxation Standpoint," by Paul Armitage, Douglas, Armitage & McCann, chairman of the Tax Committee of the American Mining Congress. It is planned also to discuss certain features of the report of the Joint Congressional Committee on Simplification of the Revenue Law and the administrative system.

A Geological Survey Hour will be a distinct feature of the closing session of the convention, when Dr. George Otis Smith, Director of the Survey, will present the work of his department and introduce to the convention four chiefs of important divisions of the Survey. This "hour" offers an exceptional opportunity for mining men to become acquainted with the staff of the Survey, and to gain an intimate knowledge of its activities.

Industrial Standardization is a subject that will receive considerable attention at the hands of the convention. Dean E. A. Holbrook, University of Pittsburgh, is scheduled for a paper on "Shall Industry Create Its Own Standards," which, in general, will

be a defense of the present system of developing standards as against Government control of standardization.

A conference on the general activities of the Standardization Division, The American Mining Congress, is also scheduled, which will be presided over by Col. Warren R. Roberts, chairman of the Coal Mine Branch, National Standardization Division. Report will be made by Colonel Roberts as to the progress of his division during the year, and an outline will be given as to activities for 1928. Reports will be received from the various chairmen of the division's sectional committees, and special conferences will be held on Acid-Resisting Metals, Mine Timbering, and Underground Transportation.

*Officers and Directors
of the
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1927



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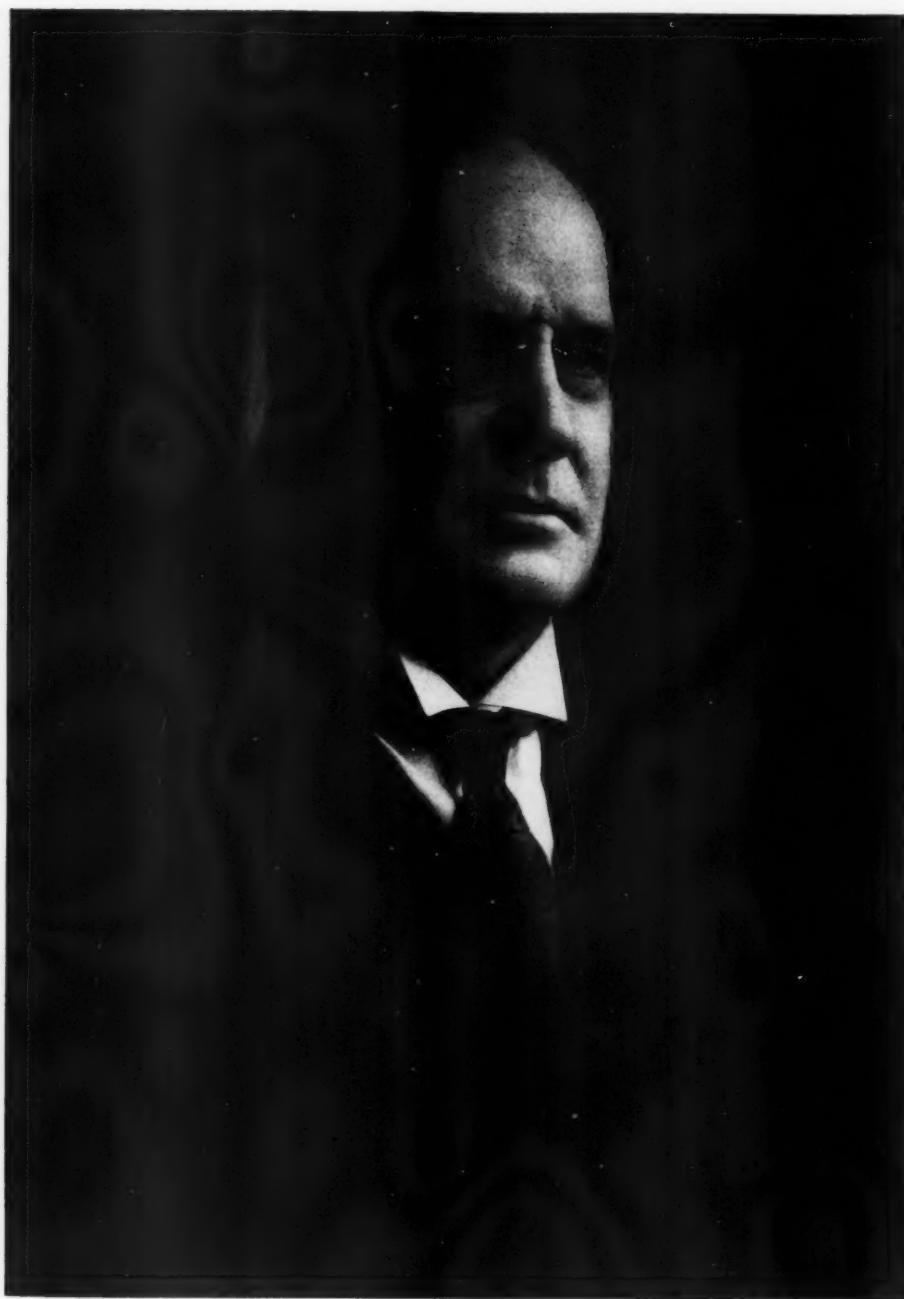
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Sidney J. Jennings



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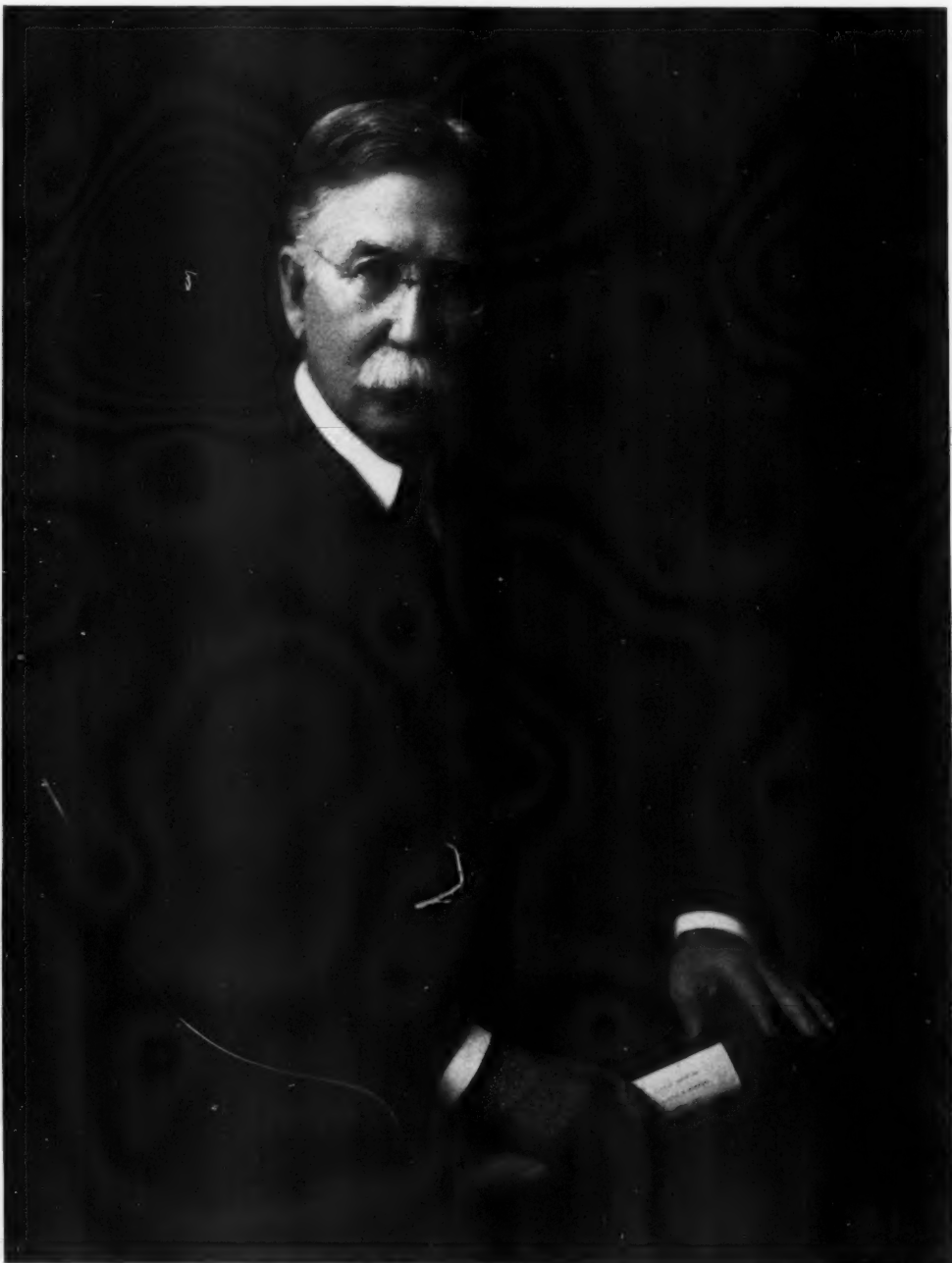
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Hugh Shirkie



*Director of The American Mining Congress.
President of the Shirkie Coal Co.*



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E. L. Doheny



Director of The American Mining Congress. President of the Pan American Petroleum Company of California.



Underwood & Underwood

James F. Callbreath



Secretary of The American Mining Congress.



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The Wishbone Tree in Rock Creek Park, Washington

A feature of the standardization program is the Mechanization Conference, called for Friday afternoon, December 2. Dr. L. E. Young, vice president, Pittsburgh Coal Company, and chairman of the Mining and Loading Section of the National Standardization Division, under whose auspices the industry-wide investigation into mechanization has been conducted, will preside, and in addition give his views as to the possibilities of mechanization in the coal industry. Mr. Southward, mechanization engineer of the American Mining Congress, will tell the delegates of his 12 months' activities during which time he has visited some 56 mechanized properties.

Oil Shale and Its Problems will be presented by Delos D. Potter, president, Federal Shale Oil Co., when he will outline the present situation in regard to that industry.

The Case for the Hydraulic Mining Industry will be presented by Congressman Englebright, of California.

At the complimentary luncheon on Thursday noon, December 1, five-minute talks will be made on "The State of the Industry," with E. W. Parker, An-

thracite Bureau of Information; Dr. E. H. Wells, president, New Mexico School of Mines; Julian D. Conover, secretary, Lead and Zinc Ore Producers' Association; A. G. Mackenzie, secretary, Utah Chapter, The American Mining Congress; and J. H. Hand, representing Arkansas, participating.

At the annual banquet the Hon. Nicholas Longworth, Speaker of the House, will give an address on "The Congress of the United States." Mr. Lindsey, President of the American Mining Congress, will preside, and G. A. O'Reilly, vice president, American Exchange, Irving Trust Company, will be toastmaster. Dr. U. G. B. Pierce will make the invocation. Strickland Gillilan, nationally known entertainer, will talk about "North of the Ears," and Miss Gladys Rice and Douglas Stanbury, of the famous "Roxy Gang," will present musical numbers.

Special arrangements have been made for entertainment, including a complimentary luncheon on Thursday the 1st, a reception and dance, the annual banquet, entertainment and dance, special golf privileges, and other items.



The thirtieth annual meeting bids high for honors in a group of annual meetings staged by the American Mining Congress that have all been of vast importance. Members of the President's Cabinet, high Government officials, and prominent mining men conspire to make the program a gem of the first water.

Presiding at the sessions are nationally known mining men—William Loeb, J. G. Bradley, H. W. Seaman, H. N. Taylor, Dr. L. E. Young, Paul Armitage, and Archibald Douglas.

To miss this convention will be a serious mistake. Its proceedings will make remarkable reading in the "Mining Log" for future generations.



THE ANTHRACITE INDUSTRY IN 1927

High Prices Imposed Upon Anthracite By Mounting Labor Costs, Excessive Taxation, Entirely Unnecessary Suspensions Causing Industry To Adopt Substitute Fuels, Are Some Of Factors In Falling Off In Production Of Between Two And Three Million Gross Tons

By EDWARD W. PARKER *

AT the time of writing this review, the indications are that the production of anthracite in 1927 will fall below that of 1926 by between 2,000,000 and 3,000,000 gross tons. Last year the commercial production (i. e., the total production less the quantity consumed in the operation of the collieries) was 69,648,420 gross tons. That is to say, the record for this year will probably be between 66,000,000 and 67,000,000 tons. The average commercial production for the decade 1917-1926, which includes the abnormal war years of 1917 and 1918, and the subnormal strike years of 1922 and 1925-26, was slightly in excess of 68,200,000 gross tons.

To what an extent the smaller production in 1927 has been due to the use of substitute fuels, principally bituminous coal, coke, and fuel oil, it is impossible to say. That the high prices imposed upon anthracite by mounting labor costs and excessive taxation, together with the interruption to supply caused by the entirely unnecessary suspensions in 1922 and 1925-26, have encouraged the use of other, if not as satisfactory, fuels for domestic purposes is undoubtedly true.

However, as Mr. S. D. Warriner, in his address before the Scranton, Pa., Chamber of Commerce on October 19, pointed out, the tendency towards any shrinkage in the consumption of anthracite has been evinced chiefly on the outer fringes of the anthracite-consuming territory where high cost of transportation is added to the other burdens the industry is compelled to carry. Mr. Warriner's statement is borne out by the fact that in the nine months of this year ended in September, anthracite shipments to New England have fallen off 550,000 gross tons; those to Canada 570,000 tons, and those to the upper lake ports 650,000 tons, or a total for three-fourths of the year of 1,770,000 tons, practically accounting for the entire decrease in production this year as compared with last. According to estimates prepared by the United States Bureau of Mines, the production of anthracite in 1927 had up to October 15 fallen off 3.4 percent, as compared with the same period in 1926. The decrease in the production of bituminous coal was 3.9 percent.

No incident in the history of the an-

"It has been pointed out that compared with 1913 the labor cost per ton in 1927 will show an increase of probably 200 percent. In the same period anthracite taxes, excluding Federal taxes, have increased in round numbers from \$5,660,000 to \$28,000,000. About \$7,000,000 of the latter figure is due to the Pennsylvania tonnage tax, the only sales tax imposed by the state, save that on gasoline, and a tax universally resented by consumers of anthracite. Besides the burden of this direct state tax—in itself heavier than the total state, county and municipal tax burden of 1913—local taxation for county, school and municipal purposes show tremendous advances."

thracite industry, certainly no act on the part of the industry itself, has been so generally resented outside of the Commonwealth of Pennsylvania than the imposition of the state tonnage tax on this exclusively Pennsylvania product. In New England indignation took the form of a meeting of Governors, called by the chief executive of Massachusetts, at which vigorous protest was expressed and the repeal of the act demanded. As Mr. Finchot was Governor of Pennsylvania and as he felt, or at least so stated, that "the state needed the money," the appeal fell on deaf ears, and a repealing act passed by the legislature was vetoed by the Governor. In retaliation, the Governor of Massachusetts, through his Commission on the Necessaries of Life, has ordered the discontinuance of the use of anthracite in all state buildings and institutions. The existence of the tonnage tax has unquestionably hampered the efforts of the anthracite producers to regain, not only in New England but in other parts of the outer fringes, the markets lost to other fuels during the strike of 1925-26.

The winter of 1926-27, particularly the latter part of it, was somewhat milder than usual, as a consequence of which there was not in the early spring months the customary demand for refilling bins, nor was there during the summer any widespread disposition to lay in the next winter's fuel supply. It is claimed by some, and probably with good reason, that installment purchases of automobiles, radio sets, electric washers, refrigerators, etc., and other luxuries and conveniences have had a direct influence on the retail coal trade, in that meeting

the installment payments has prevented many householders from filling their coal bins in advance of cold weather. At the beginning of the cooler season dealers are reporting business being done in one, two, or three ton lots, rather than in ten or fifteen ton deliveries, indicating that a considerable portion of the trade for the balance of the year would be of the hand-to-mouth character. While this will mean much inconvenience and, necessarily, additional expense to the retailers, there is good reason to believe that the total quantity of anthracite distributed (except on "the outer fringes" of the anthracite-consuming territory) will be pretty well up to normal.

If there has been any really outstanding feature in the anthracite region in 1927 it has been the newly awakened spirit of cooperation among all classes of persons directly interested in the welfare of the industry—producers, mine employes, and the general public, particularly the business interests, in the anthracite fields.

Throughout the entire region there has risen the conviction that the anthracite industry needs and should have the good will and whole-hearted cooperation of the business men and other residents whose prosperity and well-being can only be secured through the prosperity and well-being of the anthracite industry, for it is only through the stream of money that flows from the pay rolls of the anthracite companies that other means of earning a livelihood in the region are secured. The business men of the region have not only become convinced, again to quote Mr. Warriner, that the anthracite industry is not (as many had seemed to think) a Christmas tree for the distributing of largesse by a financial Santa Claus, but that it is a tree planted in the soil whose life, growth, and fruit-producing quality will continue only so long as it is given constant care and fertilization. The people of the region have taken the initiative, and by numerous public meetings in the mining communities have, at the instance of the business men, not directly associated with the anthracite industry, pledged their aid in maintaining industrial peace and in holding and extending the anthracite markets. A meeting at Scranton on October 19 under the auspices of the Chamber of Commerce of

* Director, Anthracite Bureau of Information.

that city, and an anthracite convention at Mount Carmel, November 9-11, which was addressed by Secretary Hoover, Governor Fisher, and other prominent speakers, represented the climax of these gatherings.

Anthracite mining has been a continuous industry for more than a century. It has been an old story for the people of the mining regions, and, as was natural, the continued success and stability of the industry were taken as a matter of course. Preachments of politicians and others have so long harped on the wholly imaginary "anthracite monopoly" that there had been a subconscious acceptance of the theory that nothing could ever put anthracite out of the running.

The intelligent people of the coal regions—and that phrase does not exclude the mine workers themselves by any means—have come to a realization that in the modern world there is no such thing as a fuel monopoly, and that anthracite is facing sternly competitive conditions. But while they realize that, they also realize that as a household fuel anthracite possesses qualities which make it superior to any other readily available competitor, and their desire is to restate to the buying world the advantages of anthracite, and to assure the outside public that America's best fuel, carefully prepared, is to be available in continuous supply. Interruptions to supply in the last five years have unquestionably had a deterrent effect on anthracite, and it is this effect that the anthracite region, as a unit, hopes to counteract.

It has been driven home to the minds of coal region people that out of the \$475,000,000, which is the approximate value of annual production, more than \$300,000,000 is spent in the region itself for wages, and about \$100,000,000 additional comes back to the region in the form of taxes, supplies, and incidental operating expenses. Briefly, the people in the region want to retain that annual income of \$400,000,000, which comes from anthracite, valueless in the ground but worth that much to them when mined, prepared, and sent to market.

Perhaps too much stress has been laid on the comparatively slight decrease in the production of anthracite for the first nine months of 1927. It is true that there has been some broken time, but it is true that business in general, as reflected in the statistics of revenue freight car loadings during the same period, showed a recession from 1926, and, as stated, a decrease of 3.9 percent in the production of bituminous coal, as compared with a loss of 3.4 percent in the production of anthracite.

Unusually mild fall weather—and anthracite, as a household fuel, is pe-

" * * the anthracite industry is not a Christmas tree for the distributing of largesse by a financial Santa Claus, but is a tree planted in the soil, whose life, growth and fruit producing quality will continue only so long as it is given constant care and fertilization. * * * There is no such thing as a fuel monopoly. Anthracite is facing sternly competitive conditions. * * * It has been driven home to the minds of coal region people that out of the \$475,000,000 which is the approximate value of the annual production, more than \$300,000,000 is spent in the region itself for wages, and about \$100,000,000 additional comes back to the region in form of taxes, supplies and incidental operating expenses. * * *"*

culiarly sensitive to weather conditions—has had its part in holding down demand. This, of course, was a temporary condition, certain to be corrected, as it was corrected about the middle of October. But whatever the temporary conditions may have been, or may be, the anthracite industry as a whole is wide awake, determined to hold and increase its markets, and to turn out a quality product that will be the best serviced fuel obtainable. In this policy the men directing the industry have been assured of sympathy and cooperation from the people of the coal region.

It has been pointed out that, compared with 1913, the labor cost per ton in 1927 will show an increase of probably 200 percent. In the same period anthracite taxes, excluding Federal taxes, have increased in round numbers from \$5,660,000 to \$28,000,000. About \$7,000,000 of the latter figure is due to the Pennsylvania tonnage tax, the only sales tax imposed by the state save that on gasoline, and a tax universally resented by consumers of anthracite. Besides the burden of this direct state tax—in itself heavier than the total state, county, and municipal tax burden of 1913—local taxation for county, school, and municipal purposes has shown tremendous advances.

There are some properties within the anthracite region which show, within 20 years, more than 700 percent increase in local taxes. In view of this, a decision by Presiding Judge Fuller, of Luzerne County, in a tax appeal case brought by the Lehigh & Wilkes-Barre Coal Company deserves to be considered as an outstanding event in the anthracite history during 1927.

Most of the local tax increases have been brought about by writing up valuations on anthracite properties in every triennial assessment. Thus the coal

lands of Luzerne County, assessed for taxation purposes in 1913 at a little more than \$170,000,000, were valued in 1925 at \$226,325,865, an increase in valuation alone of about 25 percent. It was from the 1925 assessment, so far as it affected its own properties, that the Lehigh & Wilkes-Barre appealed. The decision of Judge Fuller, in the initial case, was handed down a few months ago.

In this case, involving 20 parcels of land aggregating 580.37 acres in the town of Ashley, a taxable valuation of \$4,448,618 was returned. This was supposed to be 60 percent of actual market value, that being the ratio supposedly used throughout the county. The contention of the company was that the valuations were excessive and that they had been reached by an erroneous method—that of calculating the amount of coal in place and applying an assumed value per ton in the ground; in short, reducing valuation to a quantity basis instead of applying the test of actual sale value, as the law directs. The decision placed the value of the whole disputed property at \$2,410,405, which, on the basis of 60 percent for taxation purposes, makes the taxable value \$1,446,243.

Additional appeals of the Lehigh & Wilkes-Barre Coal Company remain on the trial lists, and other holders of Luzerne County coal property are likewise in position to appeal, but it seems probable that the case involving the Ashley properties may turn out to be in the nature of a test, or leading case, on the basis of which all other coal properties may be revalued. Under the 1925 valuation as returned, coal properties in Ashley were responsible for 68 percent of the taxes levied. Under the Judge Fuller ruling, even taken at its face total, coal properties will pay only 52 percent of the total taxes. The importance of this, not only in the matter of mere dollars and cents but in its political implications as well, can hardly be overestimated. The Luzerne County cases, following, as they do, the important Schuylkill County appeals of three years before, seem to be writing a new chapter of the tax history of the anthracite region.

When reason returns to its throne and the state tonnage tax is repealed; when counties and municipalities discontinue sucking the lifeblood from the industry, and when labor returns a *quid pro quo* for the high wages it is paid, the struggle to make both ends meet, and to maintain anthracite as the premier domestic fuel, will have to some extent been won.



THE BITUMINOUS COAL INDUSTRY IN 1927

By ALLAN H. WILLETT *

*Industry Prepared To Meet Any Emergency—
In Spite Of Strike There Has Been No Fuel
Shortage—Economies Established Through Effi-
cient Machine Production And Improved Meth-
ods—Industry Will Hold Its Own In Competi-
tion With Other Fuels*

THE bituminous mining industry entered the year 1927 under exceptional circumstances. During 1926 the industry had been called upon to make good the lack of fuel caused by two strikes, namely, the anthracite strike, which was settled in February, and the strike of the British miners which terminated in November.

The effect of these strikes, coinciding as they did with a year of record industrial activity in many lines in our own country, was shown in a total production of bituminous coal in 1926 of 573,367,000 net tons. This output fell only 5,700,000 tons short of reaching the record production of the war year of 1918.

The effect of the British strike was seen in the great stimulus to overseas exports during the latter half of the year 1926. Total overseas exports for that year amounted to 21,537,000 net tons, which was only 1,297,000 tons less than the overseas exports of the record year 1920.

Performance of the industry in the year 1927 naturally suffers from comparison with the record of an unusual year like 1926. Only excessively optimistic people could have expected a duplication in 1927 of the 1926 figures. As a matter of fact, both production and exports show a sharp decline. At the same time, production figures show a

substantial advance over the averages for the five years preceding 1926.

The total production of bituminous coal in the United States for the year 1927, up to and including November 5, is estimated at 445,208,000 net tons. This would indicate a production for the year running somewhere between 520,000,000 and 525,000,000 tons, whereas the average production for the five years 1921 to 1925, inclusive, was only 481,299,000 net tons. While special conditions in the industry caused low production records for 1921 and 1922, the fact remains that the country got along five years with an average supply of bituminous coal of that amount. The 1927 production will exceed that average amount by more than 8 percent.

Overseas exports for the first nine months of 1927 amounted to 2,639,000 net tons. This was far behind the 11,133,000 tons overseas exports for the same months in 1926, which were greatly stimulated by the early days of the British strike, and appreciably behind the average exports of 3,449,000 tons for the same nine months of the three years preceding the British strike. If they maintain the same normal rate during the rest of the year, total overseas exports

for the year will amount to approximately 3,500,000.

An additional stimulus was given to the production of bituminous coal in 1926 by two domestic factors—one the high degree of industrial activity

in the United States and the other the anticipated cessation of work by union miners on April 1, 1927. The result was an unprecedented call upon the industry for fuel and an average production for seven weeks in the last quarter of the year exceeding the production of any previous week in the history of the industry, culminating in the record figure of 14,676,000 net tons for the week ended December 4. In the midst of this pressing demand for coal for export and for current consumption, the industry produced no less than 12,000,000 tons for additions to consumers' stock piles. On January 1, 1927, those piles contained 55,000,000 tons, an amount exceeded on that date only in the two years 1919 and 1924. In the former case the 58,000,000 tons in storage were attributable to the war stimulus of 1918, and in the latter the anticipated cessation of labor ran stocks up to 62,000,000 tons.

In arriving at an estimate of the quantity of bituminous coal available above ground, the increase in consumers' stocks noted above should be appropriately modified by an allowance for changes during the first quarter of the year both in the amount of coal at the head of the Lakes and in the quantity in transit between producer and consumer. The former amount can be definitely deter-

* Director, Bureau of Coal Economics, National Coal Association.

mined, but the latter must be estimated.

On January 1, 1927, stocks of bituminous coal on the upper Lake docks amounted to 5,567,000 net tons, while on April 1 that amount had declined to 2,085,000 tons, according to estimates of the U. S. Bureau of Mines. The amount of coal rolling at any time is estimated by different authorities at from 10 to 12 days' production. Even at the lower figure the amount is always very large. As production was running before the beginning of the Christmas holidays of 1926, 10 days' production would have amounted to something like 22,000,000 tons. Average daily production in the second half of March, 1927, was running fully as high as in the previous December, and the indications are that quite as large an amount of coal was rolling at the later date as at the earlier. The net effect of the changes in these two items on the total supply of bituminous coal on top of ground was therefore negligible.

I may remark in passing that this ability of the bituminous mining industry to expand its production to meet sudden increases of demand is an asset of great value to the country. An actual scarcity of coal, whether for industrial use or for domestic heating, might easily constitute a calamity of great magnitude, and insurance against such a possibility is a part of the claim of the industry to public appreciation.

It is from the point of view of this 1926 background that the 1927 story of the industry must be considered. Although the English strike was settled in November, its effect was to be seen in the continuation of abnormally large exports for the first few weeks of 1927. Moreover, domestic industry was making further preparation to meet any situation that might arise as a result of the anticipated cessation of labor in the union fields on the 1st of April, and between January 1 and April 1 added no less than 20,000,000 tons to consumers' stocks, according to Government estimates. In fact, the production for the first quarter of the year was over 23,000,000 tons ahead of the production for the same period of 1926, in spite of the fact that the anthracite strike stimulated production in the former period, the Government reported. The additional demand in the earlier year was taken care of by the withdrawal of 9,000,000 tons from consumers' stocks, as contrasted with the addition of 20,000,000 tons to stocks during the first quarter of 1927, according to Government figures.

As the result of the failure of the Miami conference to agree upon a scale for the union fields, a large portion of the union miners laid down their tools on April 1, 1927. The month of April showed an average weekly production of 8,002,000 tons, as contrasted with an average weekly production for the month of March of 13,366,000 tons, a decline of approximately 40 percent.

It should be noted, however, that the significant fact about this decline is its relative insignificance in view of the circumstances. It may well be contrasted with the drop from 11,000,000 to less than 4,000,000 tons under similar circumstances in April, 1922, and a drop from 12,000,000 to 4,500,000 tons in November, 1919.

Three factors contributed to bring about the result seen in April, 1927. One was the fact that many sections of the country which were union and obeyed the suspension call in 1919 and 1922 were already operating on the open-shop basis on April 1, 1927.

In the second place, the unprecedented tactics pursued by the union enabled a considerable amount of union coal to be produced. Whereas on all previous occasions the mine workers had refused to consider any arrangement for temporary operation of union mines during the suspension, or even for the signing of new agreements by any smaller unit than the Central Competitive Field or of any outlying districts until the Central Competitive Field scale had been adopted, on this occasion it was announced that districts or individual operators so desiring could continue to operate under the Jacksonville scale pending a final agreement, and that any individual operator or any individual district, whether in the Central Competitive Field or not, could make an immediate separate agreement with the union.

The two factors already referred to, together with the production of some coal by mines changing from union to non-union conditions after the beginning of the suspension, combined to keep up the potential productive capacity of the country. The third factor referred to above was the one that limited production and prevented complete utilization of the productive capacity available. This was the decline in demand. It was true in the first week of April and in

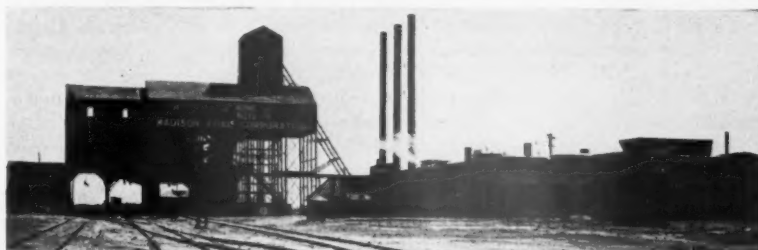
every other week during the continuation of the suspension that the factor limiting the quantity of coal produced was market demand and not the inability of the industry to mine and ship coal. At no time during the continuation of the suspension was there any serious shortage of fuel in any part of the country.

During the period of the suspension a number of individual operators continued to mine coal under so-called ad interim agreements, in accordance with which the Jacksonville scale was continued in effect, with the proviso that it should be replaced by a new scale whenever final settlement was reached. The same action was taken by a few of the coal-producing districts of the West and for a time by Central Pennsylvania in the East. The latter district, however, in accordance with the terms of the ad interim contract, gave notice of termination and abandoned this agreement on the 1st of September.

The first district settlement was reached in Illinois, where mining was resumed during the first week in October. This action of the Illinois operators was soon followed by similar action by the organized operators in Indiana, Iowa, and the Southwest. Of the districts which were operating under union agreements in March, the important ones that are still holding out are those located in western Pennsylvania and Ohio.

The experience of the industry after the cessation of work by union miners on April 1 was entirely unprecedented in the history of similar labor disturbances in the past. Attention has already been called to the fact that the decline in production in April was much less than the decline on the outbreak of any previous suspension, and that the limiting factor during the summer was market and not labor. In other words, it may be stated that for all practical purposes the effect of the suspension upon the general supply of bituminous coal was nil.

After production had settled to the new level it ran remarkably uniform throughout the summer with a slightly rising tendency. During the three months of April, May and June the average weekly production was about 8,200,000 tons, according to figures of the Government, the source also of all basic figures used in this article. During the three months July, August and September it increased to 8,950,000 tons. During the former quarter production was supplemented by the withdrawal of 11,600,000 tons



from consumers' stocks, while during the latter quarter stocks remained practically unchanged. If allowance is made for exports and imports and changes in stocks, these figures indicate a domestic consumption during the second quarter of the year averaging about 8,900,000 tons a week and during the third quarter averaging 8,360,000 tons.

These figures may be contrasted with the corresponding figures for 1926. Domestic consumption in the first part of 1927 was running at a higher rate than in the previous year. Thus the Bureau of Mines estimates average weekly domestic consumption for May and June, 1926, at 8,030,000 tons, and for the same months of 1927 at 8,316,000 tons. In the third quarter, however, conditions were reversed, and whereas consumption in 1926 averaged 9,050,000 tons a week, in the third quarter of 1927 it amounted to only 8,360,000 tons per week.

While the suspension did not result in any shortage of bituminous coal, it did have an effect, as was to be expected, upon the fields from which coal was drawn. Thus, while the total production of coal declined approximately 37.6 percent between the first and second quarters of the year, that reduction was very unevenly distributed. The four northern states of the East, namely, Pennsylvania, Ohio, Indiana and Illinois, suffered a decline of 62.3 percent, whereas four states below Mason and Dixon's line, West Virginia, Virginia, Kentucky and Tennessee, continued at practically the previous rate of operation, showing a decline of only two-tenths of 1 percent. As the strike continued, there was a very gradual increase in the percentage of coal coming out of the northern states.

One interesting phase of the industry during 1927 has been the unusually large shipments of bituminous coal to the more remote consuming areas, namely, New England, Canada and the Northwest. This situation is brought out by the following comparisons: The shipments up the Lakes for the first 10 months of 1927 amounted to 29,386,000 net tons, while the average shipment for the same period for the preceding three years was only 22,285,000 net tons. The increase was 31.9 percent.

Similarly, the New England 1927 receipts of bituminous coal to the end of September, as reported by the Massachusetts Commission on the Necessaries of Life, amounted to 17,404,098 net tons, as contrasted with average receipts for the same months the preceding three years of 14,439,567 tons, an increase of 20.5 percent. Exports to Canada for the first nine months of 1927 amounted to 11,672,000 net tons, as against an average for the first nine months of the previous three years of 9,505,000 tons. In this case the increase was 22.8 percent.

This review of the record of perform-

ance of the bituminous mining industry during the first 10 months of 1927, justifies the statement that that industry is prepared to meet any fuel emergency that may arise. It was a new experience for the country to go through a period of cessation of work by union mines during which there was not only no vestige of distress for lack of coal, but stock piles were maintained intact and unprecedented amounts of coal are furnished to New England, Canada and the Northwest, the markets most remote from the source of supply. It is difficult to foresee any circumstances likely to arise in times of peace when either personal or industrial hardship will be caused by inability to obtain adequate supplies of bituminous coal.

It should also be pointed out that this record fueling of the Nation was accomplished with practically no increase in price to the consumer. The monthly average spot price of coal for the six months of 1927, April to September, inclusive, based on *Coal Age* spot price figures, was \$2.00, the highest for any one month being \$2.12 for April. According to the same authority, the average spot price for the preceding four years had also been \$2.12.

It is somewhat presumptuous to attempt to write the record of a year on the basis of returns for nine or ten months only, and under the peculiar conditions existing today it is particularly dangerous to attempt any prophesy about the immediate future. As has already been pointed out, the indications are that total production for the year will run between 520,000,000 and 525,000,000 tons. In making such an estimate, however, it must not be overlooked that we are entering the season of the year when production is normally at its highest with unprecedentedly large consumers' stocks and with unusually adequate supplies in those sections which make it a point to lay in their winter's supply of fuel in advance. Moreover, European conditions hold out little prospect for any increased foreign demand in the immediate future.

There are developments, however, both in the field of production and in the field of consumption which hold out promise for an enlarged market for bituminous coal in the future. On the side of production the most striking current development is found in the rapid introduction of machinery, especially in the growing use of mechanical loaders. Economies from this source are being greatly supplemented by the adoption of more efficient types of organization and operation. This material reduction in cost is the only explanation to be found for the fact that very substantial increases in labor cost per ton since the war have caused a much less than proportionate increase in the total cost of production.

The figures published in the annual

reports of the Department of Mines and Mining of the State of Indiana furnish an interesting illustration of this development. These figures show that the labor cost per ton of coal mined in the shaft mines of that state during the calendar year ending September 30, 1921, was \$2.009, and that for the year ended September 30, 1926, the corresponding figure was \$1.549.

As the result of these economies, bituminous coal is becoming better and better able to hold its own in competition with other fuels. Of these rival fuels the two most direct competitors are anthracite coal and oil. Abundant statistics indicate that in certain sections of the country domestic consumers have found properly prepared bituminous coal burned under proper conditions a satisfactory substitute for anthracite. So far as fuel oil is concerned, in spite of a remarkable decline in the price of that fuel during the current year, the tendency to substitute oil for coal as fuel to be burned under boilers for the raising of steam has practically disappeared. In fact, the movement in recent times has been distinctly back from oil to bituminous coal for that purpose. This movement has been greatly promoted by the development and adoption of more efficient methods of burning bituminous coal under boilers. Oil has held its own for other than direct cost reasons in consumption by vessels and for household heating.

Even in the latter field there are developments under way which bid fair to take away from oil heating its supposed advantages of cleanliness and ease of operation. I refer to the development of automatic stokers for domestic heating, and to the possibility of reduction of the cost of artificial gas to a point where it will be commercially feasible for household heating. Rapid progress is being made in that direction. The manufacture of that gas will itself constitute a growing and finally a tremendous market for bituminous coal.

I can do no more than barely refer to other grounds for optimism with respect to the future market for bituminous coal. Mechanical stokers for industrial plants are already entirely successful, while similar devices for domestic heating give promise of great assistance in holding the domestic market. The use of pulverized coal, which has been successful in stationary plants and which now seems about to move forward as a result of tests at sea, the possibilities of liquified coal, and the discovery of new uses for the by-products of coal are all hopeful signs of greater demand for bituminous coal in the future, and hold out reasonable ground to expect that whatever "slack" now exists in the form of unnecessary mining capacity will be taken up through such expanding uses.

THE entire oil industry is now in a pronounced hectic condition. No one knows what a day will bring forth. The excess production of crude oil has brought about chaos. The big producers, the little fellows, the wild cat-ers, and even the Government are all at sea as to the best method of procedure. Attendance upon over production, correlated factors enter which still further complicate the situation. The average price of crude oil in 1925 was \$1.68 a barrel; in 1926 it rose to \$1.88; in 1927 it has dropped to \$1.25 and less. The recent improvements in cracking have greatly increased the amount of gasoline received from the crude; at the expense, to be sure, of lubricating and fuel oil.

In the oil shale field the question of what constitutes an oil shale discovery has been a matter of earnest dispute. The ruling applied by the General Land Office has been that a discovery, to be valid, must satisfy the following conditions:

First. Where the oil shale beds lie too deep to be mined by open-cut methods, such beds must contain shale capable of

* La Jolla, Calif.



*Oil Shale Cliffs,
Watson,
Utah*

by the open-cut methods, such beds must contain shale sufficient to yield 750 barrels of oil per acre in beds not less than six inches thick and yielding not less than 15 gallons per ton of shale.

Up to the present time, the law on the subject of mineral discovery has been clear and has been upheld by judicial decisions for many years. It gives the discoverer of even a

OIL SHALE PROGRESS

By VICTOR C. ALDERSON *

Two Important Questions In Oil Shale Production Are: What Constitutes An Oil Shale Discovery, And The Place Of Shale In the Oil Industry—A Review Of The Progress In The Industry During 1927 Including New Activities Along Research Lines

yielding 1,500 barrels of oil per acre in beds not less than one foot thick and within a reasonable depth below the surface.

Second. Where the beds are at or sufficiently near the surface to be mined

trace of mineral a valid claim, provided the geological and other evidences would justify a prudent man in spending his money to develop the claim. Attorneys, in attacking the department ruling, have urged that, in considering the claims of oil shale discoverers for patent, the department had read into the law details of the richness of the oil shale as a preliminary requirement that was without justification in law or in statute. This uncertainty has been a serious obstacle to the development of oil shale land in which title is held by the Government. The holders

of hundreds of claims have been anxiously awaiting a settlement of the dispute.

A recent ruling by Secretary Work, in which he reversed the ruling of the lower court in the *Summers vs. Freeman* case,



N. T. U. Oil Shale Distillation Plant, Casnealia, Calif.

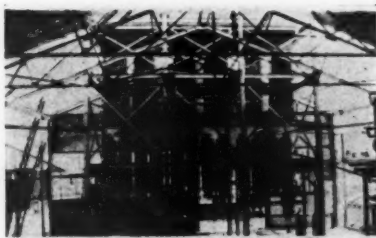
has cleared up the matter, and applicants for patent will not be subjected to the quoted rulings of the department, but can rest their case on a discovery that "a prudent man would spend his money on to develop." This reversion of the old established form, as well as a helpful attitude on the part of the department, has given hope and courage to all applicants for oil shale patents.

Much misunderstanding also exists as to the place of oil shale in the larger oil industry. In brief, oil shale is simply an adjunct, a second line of defense as a source of oil; a source to be used in case of desire, or need, or necessity, and especially as an unfailing source in case of war. The development of oil shale to a commercial basis is actually needed at present, not only as an important opening of a new source of economic wealth, but as a national protection in time of war.

CALIFORNIA

While oil shale deposits are informally reported in many regions, notably at Bakersfield, yet the Casmalia field is the best known and has been officially reported on by F. D. Gore. The outcrops in Santa Barbara County occur in the Casmalia Hills, north of Casmalia, and the Santa Ynez Mountains north of Santa Barbara. The deposits are not technically true oil shales but an oil saturated diatomaceous earth. The practical treatment of them, however, differs in no essential particular from the treatment of true oil shale. Their development is well worthy of serious consideration because the overburden is generally small in amount, mining can be done by open-cut methods, and the yield of oil will average a barrel to the ton. Thus, California, now an important well oil state, can become in the future an important producer of shale oil. Its status, therefore, as an oil state for all time can not be questioned.

At the University of California the importance of oil shale research is being recognized. An oil shale laboratory has been equipped with two retorts; one an electrically heated and controlled shaft type, with multiple coil condenser; the other a laboratory sized N. T. U. retort with condenser, dephlegmator, and the necessary auxiliary equipment. Plans for the future include a laboratory for the refining of shale oil. A. J. Carlson, lecturer in petroleum engineering, is at work on an investigation of the "Thermal Properties of Pure Kerogen." An elaborate thermostatically controlled electric oven has been constructed for subjecting the kerogen samples to prolonged heat. At the Trumble experimental plant at Alhambra, there has been steady, consistent progress—theoretical, practical, and technical. Mr. Trumble, from long experience in the oil business, is a high grade expert; consequently his



Trumble Oil Shale Distillation Plant under construction showing twelve retorts

main aim has been to produce oil from shale that is not spoiled in the operation. His tests fully justify his claims that the oil he produces is a sweet, well saturated oil. During the year many details of construction have been improved, like a superheater that will stand up under the imposed conditions and valves for the retorts that must be absolutely secure, without leaks and yet easily opened and closed. Besides tests from many deposits in the United States, shale has been sent from England, Scotland, France, Estonia, Australia, and Brazil for exhaustive treatment in his retort. The pilot retort now in use handles 10 tons in 24 hours and operates so efficiently that a 98 percent extraction from the raw shale is secured and the shale oil produced is more valuable than well oil.

It is Mr. Trumble's opinion, after much experimentation and serious deliberation, that good profit will result from refining the shale oil in such a way that the lubricating and wax cuts can be taken off and marketed separately. The balance, of course, with the exception of pyridene, would be cracked into gasoline. His process is so flexible that the raw shale can first be retorted and the various products taken off separately and put through whatever refining process may be necessary to make marketable products in the region where the plant is located.

W. C. Kirkpatrick, of the National Refining Corporation, Los Angeles, is engaged upon a new retort which will probably be completed this year. The process is intended to cover such essen-



Trumble Cracking Still, Wyoming Oil Products Company, Green River, Wyo.

tial features as continuous charge and discharge, perfect control of heat application, time temperature contacts, and carbonization. The process will be of the single cycle type. The crude is never exposed or withdrawn, but goes at once to the refining system from which the various products are drawn, ready for the market.

The N. T. U. plant at Casmalia was designed and erected by G. W. Wallace. The plan is unique in that it uses a down draft, with a downward passage of the gas and oil vapors, and does not use steam. The charge is lighted at the top with the aid of oil. The shale provides its own heat. Distillation is downward until the entire content has been distilled. Each retort, or generator, holds 40 tons at a charge, all of which is distilled, dumped in toto and the generator refilled. The plant contains four 40-ton generators; the time of distillation is 16 hours; the shale is crushed to a 2-in. size. The shale yields an average of a barrel to the ton, though, at the lowest level of the present workings, 70-gallon shale has been found. The plant has been in operation 18 months, under lease to the Associated Oil Co. and has produced more than 100,000 gallons of oil. The cost is reported to be 93 cents a barrel of oil for mining, retorting, and all other operating expenses. A plant of this type was erected by the Government at Rulison, Colo., and is said to have given a greater yield of oil per ton than the Scotch retort.

OREGON

Among the early settlers of Oregon was Nimrod Charley, who settled at the head of Antelope Creek, 30 miles from Medford, Oreg. By accident he and other hunters learned from their camp fires that certain rocks would burn though they knew the rock was not coal but its exact nature was unknown to them. These early hunters observed this burnable rock in various outcrops for 1,000 vertical feet up the north side of Grizzly Peak, the most noticeable land mark in that part of the country. One of Nimrod Charley's sons, when hunting, discovered the outcrop of shale on the land now belonging to the Pacific Lumber & Shaleries, Inc. This company now owns by patent 600 acres and by lease from the Government, 2,680 acres more. The character of the property is unique in that its value lies not only in the shale but also in the standing timber which covers the land. At Shalehurst—the name of the camp site—the deposit has been developed by an open cut 300 ft. long, 75 ft. wide at the upper end, and 175 ft. at its widest point. The shale is characterized as black and chocolate; shale with these same characteristics is found a mile and a half away on the north slope of Grizzly Peak, in Antelope

Valley, 450 ft. above Shalehurst. Samples show that shale yielding 30 to 40 gallons to the ton is available for mining and retorting. An ample supply of water is assured with many other economic advantages, such as altitude, roads, climate, and a good local market for the products.

COLORADO

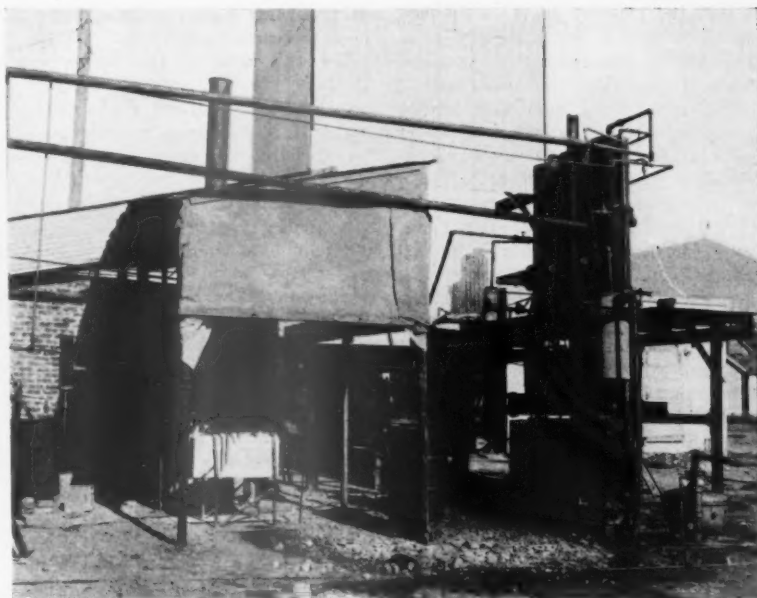
The plant of the Washington Co., at DeBeque, Colo., after several successful test runs, is in a fair way to be in continuous commercial operation in the very near future. The retort used is the Ginot type with a daily throughput of 40 tons or more. The mine proper is at an elevation of 1,300 ft. above the retort. The ore is crushed at the mine and goes down by a surface tramway, 2,300 ft. long, to the retort. The mining is done in the mahogany shale bed which yields from 50 to 60 gallons to the ton. Sufficient gas is generated in the process of distillation to supply power enough to run all the distillation unit and most of the mine equipment, crushing plant, tramway, and electric unit. The plans of the company cover the installation of a complete refining unit, besides additional retorting units for large scale operation.

NORTH CAROLINA

The oil shales of North Carolina have been studied by Dr. Frank O. Vilbrandt of the University of North Carolina. They occur in the Deep River Valley. Diamond drilling gave three notable seams of 7, 32, and 38 ft. thickness. Some of the deposits must be worked by underground methods but where the shale outcrops open cut methods can be used.

WYOMING

The Wyoming Oil Products Co., has just completed and put into successful operation a Trumble Plant at Green River, Wyo. It consists of 12 retorts, 600 pounds capacity each. The raw material is dumped into bunkers and from there into preheaters. Each preheater is constructed so that the capacity of each one is exactly that of a retort. Hence, when the contents of a preheater are dumped into a retort there is no difficulty about gauging the amount. The preheaters are especially constructed and designed to be heated by the waste flue gases from the boiler and superheater stacks. The temperature of the material dumped into the retorts from the preheaters is as close to 300 F. as it is possible to keep it. The hot products of combustion from the stacks can be by-passed in order to keep the temperature in the preheaters just below the distillation point. The steam from the boiler passes through a superheater and hydrogenator where a portion of the steam is turned into hydrogen, thence to the first retort and from there to the



Trumble Oil Shale Plant shipped to Japan. Shown here at Oakland, Calif.

second retort. From this retort the steam and hydrogen, plus the vapors from the two retorts, pass through a dephlegmator, where the heavy oil or wax fraction is trapped off. From there the light vapors, hydrogen and superheated steam, go through another superheater, where the temperature is stepped up to a point approximately 1,200 degrees F., and the same operation is repeated through the 12 retorts. The vapors from the cracking still are also sent down these 12 retorts, the gasoline fraction being taken off at the proper temperature. The plant has operated efficiently and has demonstrated the fact that 12 retorts in a circuit are not too many; in fact no pressure was lost in operating these 12 retorts, and it is quite possible that another battery of six or 12 retorts can be added. The steam necessary to distill the shale in one retort does for the 12 retorts. There is no more steam used in this operation than is necessary to handle one retort. In a large commercial plant these retorts would be of at least five tons capacity.

One of the most interesting and important features developed in the Green River Plant is the fact that the heat consumption, after the plant is in operation, is so low that sufficient fixed gas is developed from the distillation to provide all the heat necessary. The production of this gas is not made at the expense of cracking the oil. It is on account of the hydrogenation and vapor phase reactions which take place, owing to the fact that the temperature is stepped up and down between 350 degrees and 1,200 degrees F., in the presence of hydrogen, superheated steam, oil vapors and hot carbon, 12 times be-

fore the vapors are released. Furthermore, the condensing apparatus is very inexpensive because the vapors are released at a low temperature. This, of course, makes for efficiency as the specific heat is taken out of the steam, oil vapors, and gases in the last retort, helping in the distillation thereof. The daily throughput is expected to be close to 70 tons when the plant has become attuned and run steadily.

CANADA

The Maritime Education Co., Ltd., with headquarters in New York City, has acquired a Canadian Crown grant lease on 198 square miles of land, 20 miles from Moncton at the head of the Bay of Fundy. Oil shale and cannellite outcroppings have been traced for 35 miles. Nearly \$400,000 have been expended in core drilling and in other ways to ascertain the extent and value of the tract. Drilling to the depth of 1,500 ft. showed five-sixths of the distance contained commercial shale. Sir Boverton Redwood reported that one proven area alone contained 150,000,000 tons of shale. Forty-eight samples yielded an average of 58 gallons to the ton. The retort to be used on the property is known as the Hydrocarbon or "lead bath" retort. It consists of two concentric rotating cylinders, each surrounded by a jacket partially filled with molten lead and each heated by the uncondensable gas formed by distillation of the raw shale. The finely crushed raw shale passes between the heated walls and is cascaded by protruding flanges. By this method it is claimed that a very large heating surface is obtained compared with the amount of shale in process of distillation

and that the yield of oil is exceedingly high.

The Albert Mines received its name because of its production, years ago, of the famous albertite, a mineral similar to gilsonite, and at that time, of rather rare occurrence. It was mined extensively, imported into this country, and used by gas works to enrich their product. With the discovery of oil in Pennsylvania, however, the demand for albertite ceased and the mine was closed. Recently the Albertite Chemical, Oil, and Fertilizer Co., Ltd., has been formed and has acquired title to the property. The development of the property, the design, installation, and operation of a distillation plant has been placed in the hands of Louis Simpson, a well known and experienced industrial engineer of Ottawa, Canada. In comparing his process with the Scotch, he claims that his process has a better system of heat conservation; makes full use of the fixed carbon and the heat in the spent shale; uses the waste gases of combustion and prevents loss of heat by radiation. Finally, all power required is produced by individual Diesel oil engines. The combination of heat conservation, use of the fixed carbon, individual Diesel oil engines, and other improvements makes the Simpson process worthy of serious consideration.

INVESTIGATIONS AT COLUMBIA UNIVERSITY

At Columbia University, N. Y., the following investigations have been carried on by Dr. H. H. Parker, under the direction of Dr. Ralph H. McKee:

A. A new method of determining the percentage of nitrogen compounds in shale oil by the use of acetic acid.

B. Critical temperatures of shale oil products and of well petroleum products

of the same boiling points range have been shown to be identical.

Other results of Dr. McKee's work are:

1. Exact calculations of the amount of water needed to run a shale oil plant have shown that the estimates hitherto made are grossly exaggerated. The amount required, if used most economically, will be less than 20 gallons per ton of shale handled, exclusive of that required for household purposes of the workmen.

2. The cracking temperatures of shale oil to give gasoline are identical with the cracking temperatures of similar well petroleum boiling points, and the same methods of cracking when applied to one will apply to the other.

3. The evidence is now complete that shale oil and well petroleum are identical in character and accordingly that oil shale is the parent substance from which well petroleum is produced.

RETORTS

Devices for the low temperature distillation of oil shale or coal are subject to various classifications, e. g., internally or externally heated; vertical, horizontal, or inclined; dry or wet; that is, the use or non-use of steam; internal mechanical agitation of the shale or the action of gravity. Of the various phases of the industry the mining, the crushing, and the distribution sides are all matters of wide experience in allied lines of industry. The distillation to make crude shale oil and the refining of it are comparatively new subjects. A very great amount of experimental work has been done, which has resulted in a long list of retorts in various stages of development from the ideal blue print to the commercial plant. The Sheeler retort for

the low temperature distillation of oil shale or coal has reached the stage of actual commercial operation on the property of the Pacific Lumber & Shaleries, Inc., near Ashland, Oreg. It is of the vertical, circular type, internally heated, built of fire brick throughout, of tapered walls, with no internal moving metal parts, with continuous feed and discharge. The particular feature is the use of the carbon, existing in the shale after distillation, as a basis for fuel in addition to the uncondensable gas produced in the process of distillation. The retort is 36 ft. high and consists of three zones—a top distillation zone, 18 ft. high; below this a gas tempering zone, 12 ft. high; and at the bottom the new feature which places this retort in a class by itself, a combustion chamber 6 ft. high. The process is continuous. Shale is fed in at the top and passes downward by the force of gravity alone, between the outer wall and the central flue through which comes the gases to bring about distillation. After distillation the shale passes at an angle of 60 degrees outside the vertical, where its downward course is regulated by powerfully operated cut-off gates into the combustion chamber. Here the carbon in the spent shale is met by a mixture of air and steam and a combustible gas is produced. The residue is discharged en masse. The gas thus manufactured, together with the incondensable gas produced by distillation of the shale, passes through the checker work of the gas tempering zone, is deoxygenated, and passes upward through openings in the central flue to the raw shale coming down from the top of the retort. The salient features of the Sheeler retort are:

1. Simplicity of design.
2. Economy in first cost and operation.
3. Economy of heat required because of internal application.
4. No moving parts within the retort.
5. Fire-brick construction throughout.

The Trumble oil shale distillation plant, because of the use of superheated steam under pressure, is a distinct wet process. Mr. Trumble has adopted the best features of the well-known Scotch process, with improvements that add to its efficiency and throughput. He has adopted the vertical form of the Scotch, but instead of the double-decked affair of the Scotch, with ammonium sulphate the primary product and oil and gas secondary, his main product is oil and gas. The Trumble commercial retort is vertical, cylindrical in shape, 3 ft. 6 in. in diameter, tapering at the top, 16 ft. high, with a capacity of 5 tons to the charge. The retort is made of wrought iron covered with asbestos internally heated by superheated steam at 1200 degrees under 60 pounds pressure. The use of direct heat, and particularly superheated



Open cut mining, Pacific Lumber and Shaleries, Inc., Ashland, Oreg.

steam, on the shale is an economic advantage over external heat, as no heat is lost in passing through the wall of the retort; also the asbestos covering prevents the loss of heat by radiation. To make the actual process of distillation still more efficient, the shale is first put through a preheater where, at a temperature of 300 degrees, the shale is dried and much of the contained water is evaporated. The shale goes into the retorts heated and thus the time of distillation is reduced. A commercial battery should contain 12 retorts in four groups, with three retorts in each group. The time of distillation is about 4½ hours, so that a battery can treat 300 tons a day. The distinctive features of the Trumble retort are:

1. The device for opening and closing both the feed and the discharge end of the retort. This is so simple that the wonder is no one thought of it before. It is operated mechanically and the time consumed in emptying and filling a retort is strikingly brief.

2. The economical use of superheated steam. It is a well-known fact that the use of steam increases the yield and improves the quality of shale oil. The cost of producing superheated steam, however, has been a handicap. Mr. Trumble has overcome this difficulty by sending the steam at 1200 degrees through the first group of three retorts, reheating it and putting it through the second group, and so on through the four groups. Thus the heat value of the superheated steam is conserved and the cost made reasonable.

3. The continuity of operation makes for economic operation. There is no break between the crude oil when produced and the refining of it. The retorting and refining is one continuous operation, unlike the procedure with well oil, where the oil has to be carried through pipe lines long distances to the refinery. The crude oil nowhere is visible but goes directly from the retort to the refinery. Thus the cost of reheating is eliminated. In other words, raw shale goes in at one end; the finished product comes out at the other.

The Corfield process is unique in that it consists of 24 one-ton retorts placed on a turntable. One revolution in two hours gives sufficient time for complete distillation. As the cycle is completed, each retort is dumped, refilled, and started on another cycle. The retort has been tested on Brazilian, Utah, and other shales. The Distillation Products Company, which owns the patents on the Corfield retort, has contracted with the Diatom Products Company to erect a 300-ton Corfield plant at Casmalia.

Other retorts developed beyond the blue-print stage and likely to be in operation in the near future are the Brown, the Acme, invented by Prof. C. S. Crouse,



Trumble Oil Shale Distillation Plant, Wyoming Oil Products Co., Green River, Wyo.

of the University of Kentucky, and the Reed. Among the foreign retorts are the English Maclaurin, Nielsen, Lamplough and Fusion, and the German Meguin and Julius Pintsch.

CRACKING

The Trumble two-phased Cracking Process is notable for three features: First, the use of superheated steam; second, the continuity of the operation; and third, the recirculation of the heavy and heavier distillates for further cracking at 1200 degrees F. in an atmosphere of superheated steam. A Dutch oven with a long fire box supplies the heat. The flame comes in direct contact with the bottom of the still, continues around the superheater, and then is discharged to the atmosphere to heat the boiler and then to the preheater to heat the raw shale. Thus the Dutch oven supplies heat for the still, the superheater, the boiler, and the preheater. Steam from the superheater at 1200 degrees F. under 100-lb. pressure goes into the still, where all cracking is done in the presence of superheated steam. The superheated steam also goes into the carbon pot and carries part of the carbon back into a hydrogenation pot, where more hydrocarbons are formed, which go back into the still to increase the amount of gasoline produced. All the residual carbon is left in the carbon pot, not in the still. Cracking is going on both in the liquid phase (in the still proper) and in the vapor phase in the hydrogenation pot. A very small quantity of material is in the still at any one time, even though of the shell type. Crude well oil may be added if necessary to get sufficient gas for the retort and still.

The advantages of this process are:

1. The carbon difficulty is, to a large degree, solved.
2. Continuous operation.
3. A large percentage is produced from the crude oil.
4. Low cost of plant and operation.
5. On account of the small amount

of oil in the still at any one time there is little danger.

6. Ease of cleaning and repairing.

7. The only residual carbon left is not in the still, but in the carbon pot to be thrown away.

8. The fixed gases are small in quantity and are used to feed the Dutch oven as far as they will go.

WELL OIL VS. SHALE OIL

The difference between an oil field and an oil shale field is one of completion. An oil field is a piece of work completed by natural forces; an oil shale field is incomplete. That is, in the case of the oil shale field natural forces have merely gathered, in the form of plant and animal remains, the constituents of oil—carbon and hydrogen—but they have not completed the actual operation of making oil. In the case of the oil field natural forces have not only gathered the elements needed, but have also completed the operation by manufacturing the oil itself, gathered it under an impervious cap, and so arranged it as to be ready for discovery by the driller. Which is to be preferred? Clearly the oil field, if it can be found, and if nature has made enough oil to meet the needs of mankind. The struggle is to find it. The search is beset with many difficulties, because underground oil is fickle and flighty. In the case of the oil shale field the chemical character and constituents of each stratum of oil shale can be determined by analysis. A retort can be devised to treat the shale. Inasmuch as the resulting oil is a manufactured product, experimental work can determine in what particular the product can be improved, standardized, and made to fit the market, to say nothing of the possibility of reducing costs to a minimum. All this is impossible in the case of an oil field. Whatever is the outcome of drilling—gas, salt water, oil, or a dry hole—must be accepted as it is. No variation is possible. Even if oil is found it may be a highly desirable light

oil or a cheap heavy oil; it may be a gusher or only a pumper. The product as provided by nature is fixed; the oil man must accept it as he finds it and make the best of the situation, be it good or bad. Oil in a well, like ore in a mine, is a wasting asset, and, when once taken from the ground, can not be replaced. As mining towns have discovery, boom, and decadent periods, so do oil regions; when the ore or the oil is exhausted, the population moves away and the region is deserted. The fatal day may be postponed, but it is sure to come. While there may be some technical differences in the refining and marketing of well oil and shale oil there will be little or no economic difference. In the production of the oil itself, however, there will be the widest economic difference. The cost of geological investigation, wild cat wells, and the drilling of producing wells must, of course, be considered, yet when the oil comes it is a finished product. The only expense then is for pipe-line construction or other transportation. In the production of oil from shale many new factors enter, because the project is essentially a manufacturing one in a new and unpopulated region, e. g., the collection of a large labor contingent; the creation of new towns and centers of population; the necessary houses, stores, business blocks, roads, streets, movies, water systems, and all the concomitants of modern town life.

The entire oil situation at the present time is turbulent; the solution requires sober thought and wise action. To one who can view present-day facts calmly and can vision the future clearly several basal facts must be evident. Our advancing civilization will demand a smokeless fuel of high heat value, of comparatively small volume, and convenient to handle. Smoky, grimy cities will be a thing of the past. The use of raw coal as fuel will be prohibited in our cities. The entire smoke nuisance with its dirt and economic loss will be overcome. The solution lies in the use of fuel oil. Well oil, like any other natural deposit, has an end. The end of shale oil is so remote—centuries away—that its end need not be seriously considered. The development of the oil shale industry, with its necessary demand on labor, machinery, buildings, and a long list of public and private necessities spell an economic and industrial improvement to meet the needs of civilization that will rival, if not surpass, the steel, coal, motor, or agricultural industries.

ONE ACRE OF OIL SHALE LAND

The potential value of a single acre of oil shale land is seldom appreciated until the actual facts are brought out. An acre contains 43,560 sq. ft. To a depth of only 20 ft. there would be 871,200 cu. ft. of shale. At 18 cu. ft. to the ton there

would be 42,845 tons of shale. Allowing for a loss of 25 percent as waste, there would be a net production of 32,134 tons of shale on a single acre from only a 20-ft. bed. At an average yield of about a barrel of oil to the ton this would mean at least 30,000 barrels of oil. The amount of oil locked up in the many thousands of acres known to contain oil shale can be expressed only in astronomical figures. Specifically though, Kentucky is known to contain enough oil shale, yielding only half a barrel to the ton, to produce oil to an amount nine times as much as all the well oil thus far produced in the entire United States plus all that the geologists predict will be found in the future.

WORK OF THE GOVERNMENT

The United States Government has interested itself in oil shale, has withdrawn from entry large areas in Colorado and Utah, and has appropriated \$119,000 for experimental work. Under the direction of the Bureau of Mines a representative was sent to Scotland, a complete retort to the last nut, bolt and brick was purchased, imported to the United States, and a Scotch engineer, James Shaw, employed to erect it. A site was selected at Rulison, Colo., a tram constructed to the shale bed 2,700 ft. above the retort, and operations begun. Also an American retort, the N. T. U., was purchased and erected. Two thousand and nine tons of shale were treated and 891 barrels of oil produced. This was sent to the Bureau of Mines stations and to the navy yard at Philadelphia for experimental study. The plant is now closed on account of lack of funds. No official report of the work done has yet been made public. The result of all this work is negative if not disheartening. The results obtained from the Scotch retort, imported and erected in Colorado at great expense, could have been obtained for only a few thousand dollars by sending a few carloads of shale to Scotland. Nothing new could be learned about the operation of a Scotch retort in Colorado that was not already published and easily accessible, since the oil shale industry in Scotland has been in existence since 1851, a period of 76 years. Their records of operation, costs, and improvements are public property and available to anyone. Furthermore, the Scotch retort is double-sectioned; the upper for the production of gas and oil; the lower leading to the production of ammonium sulphate. This is so because the Scotch shale contains enough nitrogen to make ammonium sulphate a valuable product. From the financial point of view ammonium sulphate is the main product in Scotland and oil of secondary importance only. In American oil shales the production of oil, not ammonium sulphate, is the primary object. Hence the Scotch retort is funda-

mentally unsuited, unless it is modified, to American oil shales. Also it is well known that American experimental work on the low temperature distillation of oil shale is distinctly in advance of the English work on the subject. The average yield of the Scotch retort at Rulison was only 18.6 gallons to the ton. This is below profitable commercial production. Instead of purchasing an entire Scotch shale retort and establishing a complete plant in this country, all at great expense, it probably would have been a better plan to send a few carloads of oil shale to Scotland for a test, together with a group of Bureau of Mines experts to make an exhaustive study of the process. This would have resulted in such a saving that there would have been ample funds for the study and testing of a number of American designed retorts, like the Sheeler, the Trumble, the N. T. U., or the Catlin, each of which shows great promise of being better adapted to our oil shale deposits than the Scotch unmodified retort. There is, then, in the minds of many who are well informed on American oil shale retorting, a very serious question as to the value of the experimental work done on the Scotch retort in the United States. Unfortunately the work of the Bureau of Mines has been very largely directed in that direction, whereas other lines of work would have been more valuable to the development of the oil shale industry in the United States.

MEXICO LOSES SUIT TESTING OIL LAWS

The Mexican Supreme Court on November 17 ruled in favor of the Mexican Petroleum Company, an American concern, in the first decision involving the new petroleum law.

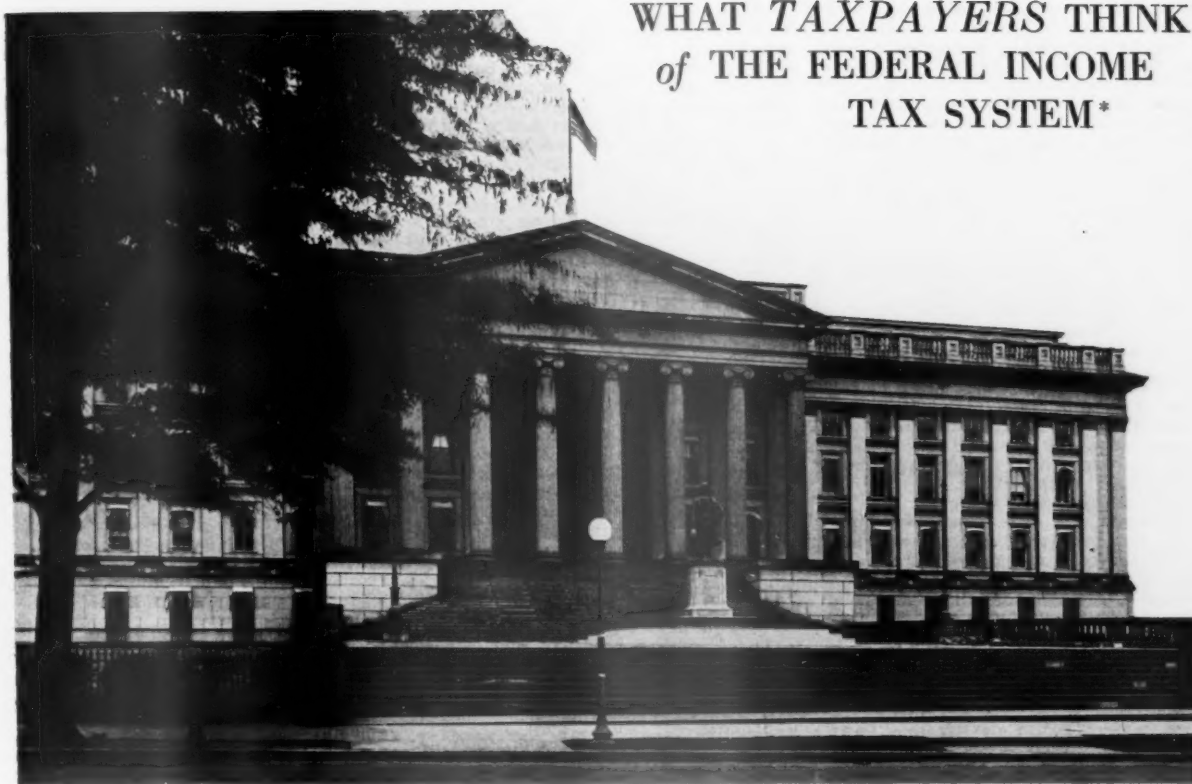
By unanimous decision, the Court granted the appeal restraining the Department of Industry, Commerce and Labor from canceling certain of the company's drilling permits.

The Court also declared unconstitutional the important Sections XIV and XV of the new law as far as this suit was concerned.

Section XIV in effect substitutes 50-year concessions for oil-land titles acquired before 1917. Section XV forfeits titles to oil lands for which no application for confirmatory concessions had been made within one year from the effectiveness of the new law.

The fact that the Supreme Court's first ruling upon the petroleum law should be unanimously in favor of one of the many foreign companies which have units pending against the law is interpreted by many observers as of the utmost significance, and as indicating the policy the Court may follow in the other cases.

WHAT TAXPAYERS THINK of THE FEDERAL INCOME TAX SYSTEM*



Replies To Questionnaire Constitute Barometer Of Public Sentiment Concerning Revenue Revision— Corporate Tax Reduction, Decentralization Of Rev- enue Administrative Organization, And Simplifying The Law By Including Only General Principles, Favored By Representative Leaders In Industry And Public Life

THE income tax law should be simplified, its administration made less difficult and expensive, and the administrative organization of the revenue department brought into closer contact with the taxpayer by means of decentralization. These are the conclusions of a majority of the 500 representative leaders in the several tax-paying groups of the country to whom the American Mining Congress bureau of economics recently submitted the following question:

"Although our Federal revenue laws have yielded sufficient revenue to meet the needs of the Government, and in addition a substantial annual surplus which has been applied to reduce the national debt, the administrative difficulties of the income tax have been enormous. The Bureau of Internal Revenue is still many years behind in the work of auditing the large returns of both individuals and corporations; the Board of Tax Appeals is already nearly two years behind with its work, with the number of appeals increasing constantly; and thus far Congress has been unable to remedy the

situation. This prompts the question: What, in your opinion, is the matter with our Federal income tax system and how may it be simplified and made satisfactory from an administrative standpoint."

The selected list of industrial and professional leaders, and others, prominent in public life, comprised: Fifty economists and tax experts; fifty bankers; fifty manufacturers; five producers of coal, five of iron, five of oil, five of natural gas, five farmers, five cotton growers, five lumbermen, five cement manufacturers, five wool growers, ten clothiers, ten stationers, ten hardware dealers, and ten jewelers; fifty editors; fifty national associations with offices in Washington; ten university presidents and professors; ten clergymen; ten lawyers; ten doctors; ten engineers; fifty transportation heads; and fifty miscellaneous men and women in public life.

Their replies constitute a barometer of public sentiment, and indicate that the general public is cognizant of existing conditions, and is giving thought to the

problems that confront Congress in undertaking to improve and simplify the internal-revenue system. Thirty percent favor simplification of the income tax forms and schedules; 25 percent believe that the personnel of the revenue de-

partment could be improved; 12 percent recommend that collectors of internal revenue be given authority to reach agreements with taxpayers for the purpose of securing prompt and final settlement of tax liability; 14 percent say "abolish the income tax" and propose the substitution of a sales tax, a pay-roll tax, a tax on expenditures, and various other theories; 11 percent believe a time limit should be fixed by law for notification of the taxpayer that his return will be questioned and a redetermination of the tax made; 6 percent are satisfied with things as they are; 2 percent present miscellaneous theories.

ADMINISTRATION

With respect to the form of the income tax return, one correspondent says:

"It seems to me important that income tax forms be simplified so that they are made readily understandable to all who must make returns. Washington bureaucrats have designed such a difficult and complicated form of return that average citizens are compelled to employ experts to assist them in obeying a law

*This article is the last of a series of five, prepared from information gathered by the Bureau of Mining Economics of The American Mining Congress, on five major national questions.

of our Government. I think such changes as are necessary can be worked out by a few hard-headed business men without any change in existing law." Another, whose statement coincides with this, contends that "A shorter form, free from the technical explanations now required, would tend to lessen errors and the form could be more quickly checked. Decisions should be so clear as to leave no doubt as to deductions permissible. At the present time, in many cases, it requires a lawyer to interpret the decisions and even then their interpretations may be overruled, all of which tends to retard the work of checking returns."

"The nature of any equitable system of taxing incomes entails complications in its administration," states one taxpayer, "but if we add to this condition the senseless red tape with which nearly every Federal bureau is burdened and bound, the wonder is that the review of income schedules is not more belated than it is actually. I suggest rational but radical simplification of the tax questionnaires. Also I suggest that the assessments and collections be administered under regional or local contracts by fiduciary concerns or by the national banks. I believe such experienced corporations would handle the business of their allotted territories expeditiously and thoroughly and that they would accept remuneration that would prove far less than the expense sustained now by the Government for the same administration."

Another expresses a somewhat similar view in the following:

"There should be no collection until after assessment, and no final assessment until after an opportunity for a review. The method of assessment and of review or equalization used for the property tax exemplifies what I mean. In Great Britain there are assessors of income tax and every taxpayer has a right to a hearing before the local commissioners, with ultimate further appeal to the Inland Revenue Department. Uniformity of assessment is secured by inspectors from the central office. For the Civil War income tax we had assessors. Self-assessment is well enough if a final and conclusive acceptance transforms it into an official assessment. This means a sufficient number of local assessors (probably not more than we now have of various collectors, deputies and field agents) and local boards of review. The chief added expense would lie in making a formal assessment roll. This would be small compared with the expense taxpayers are now put to for expert and legal advice and unending appeals."

The consensus of opinion concerning the administrative problem can be summed up in this taxpayer's statement, that:

"Most of the trouble that arises in connection with the Federal income tax comes from two causes: (a) The war revenue legislation gave the bureau a job that was really impossible of accomplishment by a bureaucratic organization which started out to do the impossible and sometimes undesirable things required in a manner that contemplated arithmetical accuracy and the attainment of exact results where, from the nature of the case, nothing of the sort was possible. Such legislation could have been administered only by a method of compromising with taxpayers

over matters which no man could decide with any approach to arithmetical exactness. (b) The other difficulty arises from the fact that the bureau is too large and cumbersome and its whole policy bureaucratic, whereas the administration of an income tax really requires a personal and more or less informal procedure which will permit taxpayers to deal directly with fair-minded and intelligent officials who know their job and have stayed on it long enough to know it well; officials, too, who will deal fairly and not in an autocratic and routine way with taxpayers."

SIMPLIFICATION OF THE LAW

That improvement of the income tax system must be sought along two lines is the opinion of one, who says:

"First, the law should be simplified. This end can not be attained by making the provisions of the statute more specific and definite. It can be accomplished only by making these provisions more general, thus leaving more room for administrative discretion. Second, the salaries paid in the income tax unit of the Bureau of Internal Revenue need to be substantially increased. That division needs, and will continue to need, the services of a large body of trained and competent experts who will remain with the department."

Contrary to this view is the opinion of another, who says the Federal income tax law should be made more specific. He believes that:

"At the present time too much is left to interpretations by the various bureaus and boards connected with the income tax department. If Congress would make the law more specific and set a time limit for reviewing income tax returns, I believe it would greatly simplify the administration thereof."

DECENTRALIZATION OF ORGANIZATION

Many of the replies received by the American Mining Congress dealt at length with the subject of decentralization of the income tax unit whereby greater responsibility is placed upon the field offices and personnel. The following represents the general opinion:

"There is too much concentration in Washington. More power should be given regional and district offices. Regional offices ought to be empowered to deal finally with the taxpayer rather than exist as agencies through which messages are transmitted to Washington. Various regional offices could receive instructions from Washington thus insuring uniformity in tax collection, but when given authority to make final settlements with the taxpayer, the long delays incident to reviews in Washington would be eliminated."

"The income tax situation can be met by decentralizing activities and giving local and final powers to local officers. We must face here as elsewhere the following facts: (a) The steady growth from economic and psychological causes of Federal power and functions. (b) The breakdown of Washington as a governing center. (c) The only solution in a broad geographical division and sectionalization of many governmental activities. The centralized governments of Europe have corps of highly trained professional administrators, supervised by a

government remote from local pressure, but themselves in close contact with people with whom they are concerned." The future of the American Government lies in this direction."

DEFINITION OF INCOME

That taxpayers have been considering seriously the technical difficulties of the income tax system, and means for their solution, is indicated by the following extracts:

"The trouble with our Federal income tax system is the initial, continued and increasing effort to qualify the term 'income,' and to constantly create or allow all kinds and classes of exemptions, deduction and definitions, resulting in a form of return so complicated that it takes an expert accountant and lawyer to figure out a basis of return, a bureau of experts and clerks to check them, with an additional Board of Tax Appeals to interpret the opinions and finds of both groups."

"As a remedy, I suggest some such definition of the term 'income' as the following: All money or its equivalent received in any one year from personal services; and as net profits on business done, or on property or goods sold; and as rent or interest from property or money on invested funds. If this definition, or any similar, clear and limiting one were applied, with no exemptions, except possibly as to minimum taxable amount, a child could figure the proportion of returns, which could be checked as easily and as rapidly as they could be read, and there could arise little reason for controversy or appeal. To insure a given amount of revenue to the Government, a flat rate, or rates smaller than existing rates would be in order; a person or corporation doing business could easily figure his tax as a definite charge on each transaction, and make such allowances as he might wish; and a return would consist of the listing of source and amounts of all income, their totaling, and the multiplication by the rate of tax."

While few express ideas parallel with the above, but indicate general agreement that the "net income" basis for the tax is sound and proper, many contend that the revenue department should give more assistance to taxpayers. For example, one taxpayer says:

"I do not believe the Government devotes sufficient effort to the education and instruction of income taxpayers. Many business men go through the year with no thought of the problems that will confront them when they have to make out an income tax return. Then they find that their bookkeeping does not lend itself readily to the income tax computation. This causes much unnecessary auditing by the Revenue Department and leads to many appeals. The Internal Revenue Department could well afford to spend a great deal of money in the instruction of taxpayers in the best way to keep their accounts to facilitate a quick and fair return. It may even be necessary for the Government to prescribe certain forms of accounting to be used by all known income taxpayers above a certain class."

And again:

"In the determination of taxable income, account- (Continued on page 896)

LEGISLATIVE REVIEW

WITH the reconvening of Congress December 5 for the first session of the new Seventieth Congress and the meeting of state legislatures in January, the interest of the country will be awakened to prospective legislative activities of the Federal and State Governments. The National Congress reopens after a recess since March 4 last, and when the presiding officers of the Senate and House take their places at noon on December 5 the wheels of legislation will begin to grind and are expected to continue until the early summer of 1928, as the forthcoming meeting is the long session, which occurs every two years. Reduction of Federal taxes and simplification of the internal revenue law will be the main objective of Congress. Already the House Committee on Ways and Means, where revenue laws must originate, has heard arguments on tax reduction and revision and is ready to report to the House for passage a new law which is expected to be known as the "1928 Revenue Act." In this work the committee has been aided by a Joint Congressional Committee on Internal Revenue Taxation, composed of members of the Ways and Means Committee and the Senate Finance Committee, which latter handles revenue bills in the Senate. In addition, the committee has had the assistance of an Advisory Committee of tax experts, suggestions of the Treasury Department and recommendations of business interests affected by taxation. Congressional leaders plan to expedite enactment of the new law so that it may be effective when 1927 income tax returns are filed March 15, 1928.

There is no doubt but that Congress will reduce Federal taxes. The question is how far the reduction will go. The Treasury Department, representing the Internal Revenue Bureau, which administers the revenue law, and in a larger sense the administration, which must figure the state of the Treasury so as to avoid a deficit in Government financial transactions, has recommended a total tax reduction of \$225,000,000. This is said by the Treasury to be the extreme limit to which taxes should be reduced as beyond this figure it is claimed the Government may encounter a shortage of revenue. On the other hand prominent Democratic leaders in Congress contend that the Treasury estimate of probable tax reduction is too low and may be extended to \$400,000,000 or more. Their

New Session of Congress Opens—State Legislatures To Reconvene—Tax Revision Outstanding Feature—Mining Bills On Slate—Tariff Revision Improbable—Review Of State Legislative Trend

claim is based on the fact that during the past five years the Treasury estimates of the Government's surplus at the end of each year have been far below the actual figures and that the state of the Treasury will stand a greater tax cut than has been recommended by the Government officials. The tax reduction program of the Treasury in so far as it relates to business contemplates a reduction of the corporation tax rate from 13½ percent to 12 percent, which it is estimated will reduce this tax by \$135,000,000, based on an estimated loss of \$90,000,000 for each reduction of 1 percent in the rate. Some Congressmen claim that a 3 percent reduction in the rate would not cut the revenue more than \$200,000,000 as the reduced rate will stimulate business and encourage the organization of new corporations which in turn will yield additional revenue. Reduction of the surtax rates is also recommended by the Government and another proposal advanced is that corporations having net income of less than \$25,000 and having less than 10 stockholders be allowed to file partnership returns.

MINE DEPLETION

In consideration of the administrative provisions of the tax law Congress is expected to act on a recommendation of the metal mining industry, submitted by the American Mining Congress, for simplification of the mine depletion section. In substance the proposed provision applies depletion on a percentage basis to metal mines. The National Coal Association has suggested percentage depletion for coal mines.

President Coolidge will outline his recommendations to Congress in a message December 6. The President is expected to make tax revision and reduction of Government expenses the main features of his message. Flood control legislation will occupy considerable attention by Congress in view of the Mississippi and New England disasters.

The first business to be performed by Congress will be the appointment of committee members in both House and Senate. There will be many changes in

committee assignments due to the first appearance of new members in the Senate and House, of which there are 10 in the Senate and nearly 50 in the House. Senator Tasker L. Oddie, who has been chairman of the Senate Committee on Mines and Mining during the past few years, can retain

that chairmanship or become chairman of the Public Lands Committee, whose former chairman is out of the Senate. It has been reported that Senator duPont of Delaware, a member of this committee, will retire because of an operation which has resulted in the loss of his natural voice and the substitution of an artificial speaking apparatus. These are the only probable changes in the membership of this committee unless some of its members are switched to other committees in a general rearrangement of committees. Two new members will be appointed to the House Committee on Mines and Mining to succeed members who are not now in the House. Representative John M. Robison, of Kentucky, is chairman of this committee.

As is usual at the opening of a new Congress, a veritable flood of bills will be introduced when Congress reconvenes. Hold-over members will reintroduce their bills of former sessions which failed to receive approval, and new members will introduce bills. It is to be expected that all of these former bills, including those for consolidation of railroads; disposition of Muscle Shoals, Alabama, nitrate and power project; the Colorado River development scheme; regulation of the coal industry; bills to forbid stream pollution and a host of other measures will be presented.

MINING BILLS

In the field of mining legislation it is expected that a number of proposals will be urged. Among these is the bill which has failed in previous sessions to grant relief to war mineral producers by allowing them to recover losses in connection with the purchase of property and interest on borrowed capital. Although the American Silver Producers Association has filed a court suit to compel the Treasury Department to purchase 15,000,000 ounces of silver at \$1 per ounce to complete transactions under the Pittman act, it is expected that a bill to carry out this purpose will be introduced and pressed at the coming session by Senators and Representatives from silver-producing states. Senator William H. King, of Utah, is among those who feel

that the pendency of this suit, which may take years to settle because of slow court processes, should not prevent Congress from carrying out the plain intent of the Pittman act and doing justice to the silver producers.

Effort will be made in the House by Representative Samuel S. Arentz, of Nevada, to raise the Mines and Mining Committee to a more important and dignified position among the committees of the House. Mr. Arentz believes that this committee ranks in importance with the major or large committees of the House and deplores the fact that this committee has been relegated to a position of more or less minor importance. He sees no reason why all important mining legislation, such as that in connection with coal strikes should not be referred to the Mines and Mining Committee instead of to the Interstate Commerce or Labor Committees as has been the custom in the past.

Concerted effort will be made by western Congressmen to secure more adequate appropriations for the Bureau of Mines. Senator Oddie has been doing considerable preliminary work during the recess to arouse the country to an appreciation of the importance of the mining industry and the necessity of its proper development through more liberal appropriations to the Bureau of Mines.

Another legislative proposal which is likely to be advanced is that seeking to regulate the issuance of securities, commonly known as the Blue Sky law. It is reported that important support outside of Congress which has been given to this legislation in previous years has been withdrawn and that the prospects of advancing this legislation in Congress are materially weakened. Another factor which is likely to operate against this proposal is the pendency before the Federal Trade Commission of an investigation of the entire blue sky situation, which involves the question of regulation by Federal and State Governments.

The administration is not expected to recommend tariff revision. Word to this effect was officially given to Congress by the heads of the Treasury Department when they were questioned on the subject by the House Committee on Ways and Means on the tax revision bill. The matter of possible tariff revision has been considered by Colorado mining interests who have gone on record against interference with the present tariff law. While individual tariff proposals are expected to be advanced at the coming session it is not likely that they will go very far in view of the disinclination of the administration to tinker with the tariff.

STATE LEGISLATION

The trend of mining legislation in the states is toward mine safety and mine taxation. A review of mining laws

passed at the 1927 sessions of state legislatures shows that 12 measures on mine safety and inspection and 9 on mine taxation were introduced, some of which were enacted into law. Two of the safety measures provide for rock dusting of mines and the others provide regulations for the interior operation of the mine in the interest of safety. The tax measures included license fees on the sale of ore and oil well drilling, gross production tax, mineral title tax and a severance tax. Four labor bills were among the group, two of which provided for an 8-hour day in mines.

Three bills each were presented concerning mining leases and for codification of the mining laws of the states concerned. On other mine matters one bill each was introduced covering the following: requiring mine owners to furnish the state with maps of their holdings; concerning mine titles; for reduction of coal freight rates; regarding protection of mines from malicious damage; to seal abandoned mines; regulating oil well drilling; regarding payments in gold; for mining surveys; mine mortgages; mine timbers; mine rights of way; and blue sky regulation.

The following is a summary of recent mining legislation by the state legislatures:

ARKANSAS

Act approved March 2, 1927, providing for the filing of a map or plan of each mine with the clerk of the county in which the mine is located. The act provides that the owner, agent or operator of every coal mine in Arkansas shall submit a map or plan of the entire workings of the mine, and every vein or deposit and the boundary lines of the area belonging to the mine. Owners of mines are required to furnish a map or plan of the progress of the workings of the mine from the date of the last survey up to the time of the making of the map. When any mine is worked out or abandoned, it shall also be reported. Mine maps or plans must show the location of doors, overcast or air bridges and the direction of air currents. These maps shall be recorded as maps and plans of townships are recorded. Owners of mines who fail to respect this law will be subject to a fine of from \$100 to \$500, each day to constitute a separate offense.

CALIFORNIA

Act approved April 13, 1927, for the regulation, control and licensing of any person, firm or corporation engaging in the milling, sampling, concentrating, reducing, purchasing, or receiving for sale, ores, concentrates, or amalgam bearing gold or silver. This act provides a license tax of \$25 per year payable to the state. Licenses are restricted to

bona-fide residents of the state or corporations organized under or subject to the laws of the state. The act does not require a license for any mill, sampler, concentration, or reduction plant used exclusively by the owner in sampling, milling, reducing and concentrating ores produced by such owner. The state mineralogist is in charge of carrying out the act and prescribes reports required thereunder. Persons licensed under the act are required to make a monthly report of purchases under the act. Violation of the act subjects the offender to a fine of from \$100 to \$1,000 or by imprisonment for 30 days or 6 months or both fine and imprisonment. Violations of the law are considered criminal and handled by the district attorney of the county in which the violation occurs. The expenses of carrying out the act are taken from the license fees and the balance goes to the state treasury.

IDAHO

Bills were before the legislature, but were not acted on, which provided for a tax on the gross annual yield of mines, and relating to the valuation of mines for taxation.

ILLINOIS

Act approved June 29, 1927, regarding shot firers in mines where shooting and blasting is done.

Act of June 29, 1927, amending a former act promoting safety in coal mines by regulating the character of black blasting powder sold to be used in such mines.

Two other coal mines bills were before the Illinois Legislature at the last session, but were not passed. These bills were in the senate branch of the legislature and proposed to amend former acts regarding the health and safety of coal miners. One of these bills prescribed the manner of handling blasting powder and explosives around coal mines either by the miners or for storage purposes. The other bill related to the mine inspection service in the state, and proposed 12 state mine inspectors. This was an extensive bill of 21 sections.

INDIANA

Act approved March 8, 1927. This act requires coal mines employing more than 10 men to rock dust their mines. It provides fines of from \$50 to \$500, imprisonment for 60 days to 1 year or both fine and imprisonment for violation of the act.

Act approved March 7, 1927. This act provides for ventilation of coal mines and prescribes the duties of fire bosses, hoisting engineers and the chief mine inspector.

KANSAS

Bills were introduced, but failed to

pass, providing as follows: For rock dusting of coal mines.

For a gross production tax on oils and minerals, 2 cents per barrel on petroleum, and 2 cents per ton on coal and other minerals, payable monthly.

Providing for separate titles to the surface of land and for the minerals therein and for their separate taxation, except on oil and gas royalty deeds or assignments.

For the recording, valuation and taxation of the right or title to minerals, gas and oils, in land where the ownership in fee of the surface of the land is in another, except as to oil or gas reservations or leases, until they have acquired a value by reason of the discovery of oil or gas on the land or adjoining land. This bill was recommended by the Committee on Assessment and Taxation of the House branch of the Kansas Legislature.

Providing that oil, gas and mineral leases may be executed by the fee owners of the land without the royalty owners joining.

Providing a 3 percent tax upon the gross production of gas and oil, payable monthly.

MICHIGAN

An act amending a former act to punish willful and malicious injuries to mines and property used in mining and imposing a fine of not more than \$5,000 or imprisonment for not more than 20 years.

An act regulating the drilling of oil wells under the jurisdiction of a supervisor of wells in the conservation department. The bill also prescribes methods for plugging abandoned wells. Applications for drilling wells must be made to the supervisor, accompanied by a permit fee of \$10. Persons abandoning wells or test wells must notify the supervisor and adjoining owners of land and shall plug the well under direction of the supervisor. The act provides that wells which have been abandoned since January 1, 1925, shall be plugged in accordance with this act. The act does not apply to coal test holes not exceeding 3 inches in diameter nor to test holes for iron and copper in iron and copper bearing districts. Violation of the act shall subject the offender to a fine of from \$50 to \$100 or imprisonment for 90 days, or both.

A bill prescribing an 8 hour day in mines, mills, quarries, factories or manufacturing establishments was defeated in the House branch of the Michigan Legislature by a vote of 12 to 64.

MINNESOTA

An act recommended by the state superintendent of mines dealing with the manner of leasing state owned lands for mining purposes. The purpose of the act

is to correct certain classifications and methods of advertising. This act abolishes the former classification of state lands into classes in accordance with the iron ore or iron bearing material likely to be found therein as follows: Lands containing iron ore, the larger part of which may be shipped without beneficiation; lands likely to contain iron ore capable of being beneficiated by washing, drying or screening; lands likely to contain iron ore and iron bearing materials requiring magnetic separation methods; lands containing iron ore or iron bearing materials where a combination of two or more of the foregoing processes of beneficiation may be necessary. The act provides that the state auditor shall divide state lands into mining units of not more than two continuous areas of 40 acres each. In the case of lands containing low grade magnetite ore deposits the area shall not exceed three units.

NEVADA

An act providing an 8 hour day for labor in underground mines.

An act providing that in suits concerning the assessment and taxation of the proceeds of mines, the burden of proof shall be on the mine owner to show that it is unjust, improper or otherwise invalid.

OHIO

The House branch of the legislature passed but the Senate defeated a bill designed to remove discrimination against Ohio coal mines and consumers of Ohio coal, by providing for reductions in the present intra-state freight rates.

Act effective July 25, 1927, relative to the operation of mines. The act covers ventilation practices and provides that mine foremen of gaseous and non-gaseous mines shall be examined and licensed by the mine inspector of the state at fees of \$2 and \$1 each. All mines in which 25 or more persons are employed shall have at least one certified mine foreman. Certificates are also required for fire bosses. Regulation of travel-ways in the mines is also prescribed. The employment of boys under 14 is forbidden. Persons desiring to drill for oil or gas must apply to the Division of Mines. No well shall be drilled nearer than 300 feet to any mine opening.

The House branch of the legislature reported but no action was taken on a bill providing penalties for failure to cover or protect an abandoned mine so as to prevent its becoming a menace to the community.

No action was taken on bills for the appointment of a commission to codify the mining laws of Ohio and prescribing the appointment of not more than 10 mine inspectors.

OKLAHOMA

Act approved March 24, 1927, providing for a board of five members to codify the laws of Oklahoma relating to coal and metal mining, based on the claim that they are now inadequate and conflicting. The board is to report at the next session of the legislature. The board will be headed by the chief mine inspector of the state and four other members will complete its personnel. One of these shall be a coal mine operator of not less than 10 years experience in Oklahoma or a mining engineer of like experience; one of 10 years experience as a coal miner in Oklahoma; one as a lead or zinc mining operator of not less than 5 years experience or a mining engineer of like experience, and one shall be a lead and zinc miner in Oklahoma of not less than 5 years experience. The act appropriates \$2,500 to meet the expenses of the board.

OREGON

An act repealing sections 2311 to 2316 of the Oregon laws relating to gold bars and gold dust. These sections provided that judgment may be given for its payment in a specific kind of money. The sections were repealed because they served no good purpose and have been considered for many years to be dead letters.

Bills were introduced, but failed, providing an appropriation of \$40,000 for maintenance of the Oregon Mining Survey, and amending the Oregon law regarding lien cases to bind a mine.

PENNSYLVANIA

Act of April 20, 1927, repealing the act of June 1, 1883, which provided for the furnishing of props and timbers to miners in mines.

Act of April 20, 1927, repealing the act of May 25, 1883, which provided means of conveyance of persons injured in mines to their homes.

Act of April 21, 1927, repealing the act of June 30, 1885, regarding the health and safety of persons employed in anthracite mines and for the protection and preservation of property connected therewith.

Act of April 22, 1927, repealing the act of June 30, 1885, relating to the health and safety of persons employed in bituminous mines.

Act of April 27, 1927, providing regulations for the health and safety of persons and the protection and preservation of property in bituminous mines. This act provides for cut-throughs in entry pillars, air circulation, safety lamps in gaseous mines, ventilation of mine workings, and the application of shale dust or other material in gaseous mines.

Act of April 28, 1927, authorizing churches, ceme- (Continued on page 906)

PROGRESS IN STANDARDIZATION IN 1927

By COL. WARREN R. ROBERTS *

Results Of Eight Years' Activities Reviewed— Many Of Original Projects Now National Standards—Much Work Remains To Be Completed— Mechanization Program Making Excellent Progress—How National Standardization Affects Mining Standards

THIS review has reference to standardization in the mining industry only. However, some related subjects will be discussed in the latter part of the article.

Our chief progress during the year, as will be noted from the detailed statements following, has been in completing the revision of the reports, specifications, etc., which have been underway for several years, and securing the approval of several of these reports by the American Engineering Standards Committee, and also in bringing other of our reports up to the final stage for approval.

When this latter work is finished, we will have completed the program of standardization for the mining industry which was formulated at our first standardization conference some eight years ago. This original program, however, has from time to time been very greatly extended, and the scope of our completed work is therefore not only broader than originally planned, but in many instances includes detailed specifications and codes of practice that serve as a complete guide to the mining industry on these subjects.

We are now ready to consider other and more advanced problems looking to the improvement of mining practice and falling within the classification of work allotted to each of our committees. At the same time, each and all of our committees will accept, and take under most careful consideration, any suggestions for the revision of their reports which have been already approved and thereby act as a standing committee to keep all of our recommendations, standards of equipment, etc., up to the best present day practice.

For the purpose of making our committees still more representative of all interests, and also to broaden the viewpoint of each committee, we are reorganizing and enlarging all of our committees. This reorganization of our committees when completed will meet the new conditions created by the action taken at our last Standardization Conference held in December, 1926, in connection with the annual meeting of the American Mining Congress. At this conference we discussed at length the advisability of withdrawing certain of our reports from the American Engineering



Col. W. R. Roberts

Standards Committee, and it was finally decided by the conference to withdraw any of our reports on which it seemed we would be unable to secure approval within a reasonable length of time.

In accordance with this action of the conference we later withdrew the report of our Committee on Coal Mine Ventilation. We believe this action of our Standardization Conference, and approved by the American Mining Congress at their annual meeting, was fully justified, and it would appear to have had a beneficial effect, for the reason that soon afterwards we secured the approval of some reports that had been long delayed in approval by the very complicated methods of the American Engineering Standards Committee.

It will be convenient in reviewing the progress of the work of our various committees and the present status of their reports to classify them as follows:

- A. Committee Reports Approved.
- B. Committee Reports near Approval.
- C. Reports of other Committees.

A. REPORT ON "COAL MINE DRAINAGE"

The report of our Committee on Coal

Mine Drainage, as revised by the Sectional Committee reviewing this report, was finally made satisfactory to all interests represented on the reviewing committee and was approved by the American Engineering Standards Committee June 2, 1927. This report is, therefore, now a tentative American standard.

A. JOINT REPORT ON "POWER EQUIPMENT AND UNDERGROUND POWER TRANSMISSION"

These two committees rendered a joint report, which was reviewed by a sectional committee of the A. E. S. C., and during the discussion of which by this sectional committee it was finally decided that this sectional committee should include and combine with their report a technical paper from the Bureau of Mines covering a portion of the matter contained in our joint report.

After a very careful consideration of the whole matter, this sectional committee brought out a combined report and submitted it to the American Engineering Standards Committee for approval. This sectional committee entitled the combined report "Safety Rules for Installing and Using Electrical Equipment in Coal Mines," which was approved by the American Engineering Standards Committee October 8, 1926.

A. REPORT ON "WIRE ROPE FOR MINES"

When the report of our Committee on Outside Coal Handling Equipment was presented to the A. E. S. C. for approval as a standard, and after the sectional committee had been appointed by the A. E. S. C. to review this report, it was decided by the sectional committee to divide the subject matter of this report into three sections, each of which was to be submitted to a separate sectional committee for review and recommendation to the A. E. S. C. That portion of the original report, covering the use of "Wire Rope for Mines" has been completed and was finally approved by the American Engineering Standards Committee on February 24, 1927, and is therefore now a tentative American standard.

A. REPORT ON "MINE TRACKS AND SIGNALS"

When the report of our Committee on "Underground Transportation" was submitted to the A. E. S. C. for approval, and in turn was submitted by them to a sectional committee for review, this

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sectional committee, being unable to report for approval the entire subject matter of this committee, suggested that portion covering "Mine Tracks and Signals" be taken out and submitted to a separate sectional committee. This was done and this sectional committee, after extensive revision of the report, finally approved it and sent it up to the A. E. S. C. for approval.

This report was approved by the A. E. S. C. May 13, 1927, and is therefore now a tentative American standard.

B. REPORT ON "OUTSIDE COAL HANDLING EQUIPMENT"

As stated above in giving status of report on "Wire Rope for Mines," the original report from our Committee on "Outside Coal Handling Equipment" was divided into three sections, namely—

The section covering "Wire Rope for Mines," which has been approved by the A. E. S. C.

Another section on "Ladders and Stairs for Mines," and

A section entitled "Outside Coal Handling Equipment."

These two latter portions of this main report have now been revised by the sectional committee reviewing them and are up before the A. E. S. C. for final approval.

B. REPORT ON "UNDERGROUND TRANSPORTATION"

As indicated above in advising that the report on "Mine Tracks and Signals" had been approved by the A. E. S. C., the report of our main Committee on Underground Transportation had been divided by the sectional committee reviewing this report for convenience and to expedite the approval of a portion of the report. The balance of this report is now nearing final completion by the sectional committee reviewing it, and will be ready to submit to the A. E. S. C. for approval shortly.

C. REPORT ON "MINING AND LOADING EQUIPMENT"

Our Committee on "Mining and Loading Equipment," and especially the subcommittees Nos. 1, 2, and 3 on "Mechanical Loaders," "Underground Conveyors," and "Methods of Mining for Mechanical Loading," respectively, have been very active during the past year. The mechanical loading of coal being an important factor in the reduction in the cost of mining coal has brought this subject into such prominence that it was decided a year ago by the American Mining Congress, in cooperation with the manufacturers of mechanical loading equipment, to engage an experienced engineer to devote his entire time to the work of this committee. Mr. G. B. Southward was therefore engaged by the Congress to

carry on an extensive investigation of mechanical loading under the direction of this committee. His work has been most gratifying, not only to your general chairman but to Dr. L. E. Young, chairman of this committee. Mr. Southward's reports have been appearing in THE MINING CONGRESS JOURNAL, and they indicate the extent of his investigations, the care with which they have been made, and the systematic grouping, etc., for reporting the investigation to give them the greatest possible value to the coal mining industry.

As this committee will meet on the 2d of December in Washington in connection with the Annual Conference of the National Standardization Division, and at which time this entire subject will be reviewed and discussed at great length, I will not report on it further at the present time.

C. REPORT ON "MINE TIMBERING"

This main committee is divided into six subcommittees, all of which have been more or less under state of reorganization and enlargement during the present year.

Two subcommittees, namely, No. 2 on "Preservation of Mine Timbers" and No. 3 on "The Use of Concrete in Mine Construction and Timbering" have made considerable progress during this year, and will doubtless have progress reports to render at our annual conference December 2 and 3.

We consider that this committee has a subject for investigation which, if diligently pursued, would be of very great value to the coal mining industry. A simple enumeration of the work allotted to each of the subcommittees is sufficient to indicate the economies which could be secured in coal mining if each of these subcommittees would secure the information needed to enable them to make recommendations for improvement in the methods and use of materials for mine construction and mine timbering coming within their subdivision of this work.

We hope during the coming year to have each of these subcommittees vigorously pursue their work and be able to render a valuable progress report for our next year's annual Standardization Conference.

The continued growth of our standardization work has made it necessary to secure a secretary for the Standardization Division who could devote all his time to handling the voluminous correspondence required in directing the work of our numerous committees and subcommittees. Mr. J. M. Hadley has been secured for this responsible position, which he will fill under the general direction of our former secretary and your general chairman. We anticipate very beneficial results by this addition to our

working organization, as it has been impossible for those of us who have supervised these activities to spare sufficient time from our numerous duties to keep up with the increasing requirements and properly direct an undertaking of the extent of our present Standardization Division.

During the past year it has become necessary for us to consider seriously some of the questions of national standardization as they affect our work of standardization for the mining industry. We will mention briefly some of these more important questions and discuss them from the viewpoint of our Standardization Division. We will also suggest why these questions must be considered by our Standardization Division at our annual conference.

We hope that this brief presentation of the subject will enable the members of our Standardization Division to give some time and thought to these matters and come to our conference prepared to make suggestions for our guidance in harmonizing our Standardization work with that of other industries.

For the past year or two there has been much discussion among the member bodies of the American Engineering Standards Committee regarding the "Methods of Work" and the "Rules of Procedure" of this committee. Out of this discussion there has been advanced many suggestions with the object of improving and expediting the work of this committee. Some of the plans advanced extend to an entire reorganization of the committee. It would appear, however, after having followed all this discussion, that there was such a variance of opinion regarding how to reorganize or improve this committee, or change these methods of work and rules of procedure, that it will be a very considerable length of time before the member bodies of the committee, with their diverse interests, will reach any conclusion.

It is no exaggeration to say that this committee is at present in a most chaotic state, and that it is of the utmost importance that a decision should be reached at an early date as to whether this committee is properly organized to direct this important work, or whether it must be reorganized, and if so how such reorganization can be effected to the best interests of all the member bodies.

It will be evident to anyone familiar with the work of the Standardization Division for the mining industry, and also with the procedure in the past of having the reports from our various committees approved by the American Engineering Standards Committee, that any delays caused in the approval of our reports by the lack of proper functioning of the A. E. S. C. may seriously affect the

progress of our work. Therefore, so long as we continue the practice of having any of our reports approved by the A. E. S. C. we are vitally interested in any plan for improving "The Methods of Work" and "The Rules of Procedure" of this committee.

Our experience with this committee during the past four years has indicated very plainly to us that there was need of improvement in their methods to avoid undue delay in bringing out industrial standards, and therefore we are in favor of such changes in "Method of Work" and "Rules of Procedure" of this committee as will enable any industry to have standards which they formulate approved within a reasonable length of time.

As I have stated above, however, there is so much adverse opinion among the member bodies as to how such improvement can be effected in this committee that at the present time the situation looks hopeless. It was for the reason just stated that at our Annual Standardization Conference last year it was decided that we withdraw such of our reports from the A. E. S. C. as it seemed there was no prospect of having approved within reasonable time.

Out of the discussion of the American Engineering Standard Committee, as outlined in the paragraphs above, there has come suggestions that the work of industrial standardization would be greatly expedited and much effort conserved by placing all our industrial standardization under the central authority of the Division of Simplified Practice in our Department of Commerce.

I may remark in connection with the above suggestion that it is in line with present-day political practice. There seems to be a constant and increasing tendency to transfer to our federal government all of the duties of our citizens, of our cities, and even of our states.

A volume could be written on the subject of the baneful influence of over-centralization in our democratic form of government. In fact, volumes have been written against this harmful tendency. It has been pointed out repeatedly that we are gradually but positively becoming a bureaucratic government, and such a government is no less harmful in its administration in a democratic country than in a monarchical government.

Therefore, on the broad general principles involved, we are unalterably opposed to the suggestion of placing industrial standardization in this country under any branch of our federal government.

The excellent work done and the results accomplished during the past few years in the standardization of its products by many of our industries are most gratifying. It would appear that the agencies already set up in each of these industries

for carrying on standardization are adequate, and that no change should be made in the methods of approving standards formulated by the industries which would discourage their efforts or unduly delay their work.

We have entire confidence that if the leaders of standardization in the various industries will diligently cooperate in solving the problem of reorganizing the A. E. S. C. to meet the present objection to its methods of procedure, that this will be much wiser than trying to set up any new agencies for this purpose, or in transferring this function to some governmental agency.

We wish to assure the other member bodies of the A. E. S. C. that the American Mining Congress, notwithstanding their criticism of the present methods of procedure of this committee, are vitally interested in having such changes made in these methods that will secure the results we desire with the least delay and the least disturbance to the committee in carrying on during this reorganization.

INCOME TAX SYSTEM

(Continued from page 890)

ing experts seem to me to be running into metaphysical distinctions, which in many cases are meaningless, in the effort to do this job, and the same is true of the Government experts. I know of many businesses which are at a greater expense to prepare their returns as the Government demands than the total amount of the tax they pay. The administrative burden, therefore, is become a serious consideration to business."

THE CORPORATION TAX RATE

Several commented on the discriminatory differential that exists against corporate taxpayers as compared with individuals. All of these believed that the corporation tax should be substantially reduced to be more nearly in line with the normal rate on individuals. One statement says:

"The one great fact which should be kept in mind is that of the proper distribution of the tax burdens. We can not attain the ideal, of course, but it is obvious to anyone who has given attention to this that our present system of Federal taxation is unbalanced, unjust and unscientific. There should be a reduction of the corporation income tax at this time to bring it into line with other forms of conducting business."

"Adjustment in income taxes since 1920 has not been fair to corporations. While the individual income tax has been reduced, corporation taxes have been increased, and any adjustment of income taxes should be upon a uniform basis."

REVISION OF THE LAW

Congress, in the revenue act of 1926, created a Joint Committee on Internal Revenue Taxation, to be composed of five Senators and five Representatives, members of the Finance Committee of the Senate and the Committee on Ways and Means of the House, respectively. The Joint Committee was directed, by the act

creating it, to study the operation and effect of the internal revenue laws, particularly the income tax, and to report any recommendations for simplification of the law and its administration to Congress on or before December 31, 1927. Taxpayers generally feel that this was a step in the right direction; but if the results of the American Mining Congress inquiry are an indication of public sentiment, the rank and file of taxpayers believe that better results could be accomplished by a law revision committee appointed from civil life. The following deal with this phase:

"The methods to be adopted to secure both simplification and efficiency in the administration of the income tax system, should be sought through public accountants, auditor executives and trained business executives of large affairs. A board composed of 25 of the most capable and experienced of these ought to find the satisfactory working system."

"The Federal income tax system as it now exists is unnecessarily obscure in some of its requirements and is, further, cumbersome in its methods. It might easily be simplified and made more nearly satisfactory by taking it out of politics. A committee of competent citizens, who were not seeking, and never intended to seek, public office, and were consequently indifferent as to the effect their action might have on the voting in their respective districts, could easily frame a revenue measure which would be simple, equitable and more easily administered."

"To pool the experience of both political parties to the tax question, a public committee of five duly qualified and able men might be appointed to act with Treasury officials in working out changes and improvements in present tax regulations. Such a committee might be composed of one representative from each of the following professions: Mining, agriculture, manufacturing and banking, with one member from private life."

Inasmuch as no two taxpayers are affected by the income tax law in precisely the same manner, it is not strange that no two opinions received in response to the questionnaire are exactly the same. Practically all agree as to the facts, but few suggest the same remedy for the existing situation. None the less, the criticisms and suggestions in general are constructive. The interest shown undoubtedly has been helpful to the Joint Congressional Committee, which has just reported to Congress on certain phases of the income tax system.

The Geological Survey has issued reports on "The Brown Iron Ores of West-Middle Tennessee"; "Quicksilver Deposits of the Pilot Mountains in Mineral County, Nevada"; and "The Gillette Coal Field of Northeastern Wyoming."

Recent statistical reports of the Bureau of Mines include the production, value, men employed, days worked, and output per man per day at coal mines in the following states for 1926: Pennsylvania, Montana, Michigan, North Dakota and South Dakota.

WHAT MANUFACTURERS' COOPERATION STANDS FOR in the MINING INDUSTRY

By H. K. PORTER *

*Cooperative Understanding Between Operator
And Manufacturer Of Immeasurable Benefit—
New Devices Frequently Brain Children Of Both
—Free Exchange Of Ideas Result Of Meetings
Sponsored By The Manufacturers Division—
Shirt-Sleeve Cooperation*

FUNK AND WAGNALL'S may give a classical definition of the word "cooperation," but the man who has devoted his life to digging coal from the so-called bowels of the earth knows that the true meaning of the word is "everybody pulling together and in the same direction." Dress it up as you may, you can not kill or change the back-to-nature meaning.

Strange as it may seem and as commonplace as it may be, proposed advancement in the manner of doing things or in the tools to do things with, has frequently been looked upon with suspicion. Happily, however, industries in general are less prone to view new developments in the arts with an askant air for they have tasted of the fruits resulting from the inventions or innovations developed by manufacturers and they are now giving a helping hand. The day is not so long gone when a manufacturing enterprise which brought out a new device or plan was suspected of desiring to obsolete the old purely from mercenary motives.

Exploitation by the producing ends of equipment used in the mining industry is now only an idle dream, if it ever did exist except in isolated cases, for, more by design than by luck, any new developments in machinery or methods are the result of the combined energies of both manufacturers and mining men.

This change for the better is but a paralleling of what has happened in the steel industry and with the railroads. Men in the steel industry through the Iron and Steel Institute meet with the equipment builders and frankly state their problems and ask for assistance. In the railroad world a large coal tonnage line was about to electrify its track-age over a barrier mountain. The expense was all but prohibitive so they called in several locomotive builders. The results of the combined studies of locomotive experts and practical railroad men pointed toward the birth of a design of a radically different type of locomotive which was adopted by the railroad. The pigeon-hole now holds the elaborate electrification program. That was plain shirt-sleeve helpfulness.

In our own organization, the American Mining Congress, we have during the



H. K. Porter

last few years been building up an understanding between operators and manufacturers which has produced immeasurable benefit to both. In the many standardization committees covering all phases of mining activities, we find the producers and the suppliers serving side by side, each lending a sympathetic ear to the remarks of the other, both intent upon learning the problem of the other. Until this committee work was inaugurated, many manufacturers were interested in selling certain equipment because it would bring in revenue, but they did not know whether or not it would help the coal producer's finances as much as it would help their own. Probably if the truth was known, indifference as to ultimate gain would have shown its tracks.

And as in other industries, new devices or accessories are not thrust upon unsuspecting buyers. All major developments are now the children of the brains of both operators and manufacturers, one suggesting and the other freely

criticising, both arguing as to the ends to be attained or the easiest solution of the tangle. Finally there is begun the marketing of a design or an idea, which will aid the entire industry in the age-old battle of "producing a ton of coal at the lowest possible cost per ton."

The Manufacturer's Division of the American Mining Congress through the annual exhibitions of new and improved machinery and methods has been very happily conscious of the fact that they have provided a common meeting ground for study and discussion where the results of the efforts of the laboring committees and subcommittees may be discussed in open forum for a week once each year.

It has been the aim of the division to seek the assistance and actual guidance of the industry in the preparation of programs. We have been fortunate enough each year to have a recognized leader among the operators shoulder the titanic burden of drawing together the thoughts of other leaders and eventually evolving a program devoted entirely to the practical art of producing and oftentimes the selling of coal.

The programs have also been very richly enhanced by the points which have grown from the excellent study of the mechanization of mines prosecuted by the parent organization with the generous aid of operating units throughout the country who have unhesitatingly and unstintingly exposed their secrets of improved means and methods that the industry as a whole might reap the benefits. There are no longer niggardly thoughts that by keeping advanced methods hidden, one unit can profit and the others lose—the industry knows that it must succeed as a whole and succeed it will, simply because each will understand the other.

And we as manufacturers know that as you succeed we are bound to succeed in like proportion. We want to again express our gratitude to you for your helpfulness and to express the hope that we, as a division of the American Mining Congress, may continue to enjoy your freely given "shirt-sleeve" cooperation. Especially is this true in connection with our annual exhibitions, which, we will aim always to make so practical that you can use them as an educational institution for the rank and file of your organization.

* Hyatt Roller Bearing Co.
Chairman, Manufacturers Division, The American Mining Congress.

REPORTS ON THE MECHANIZATION SURVEY

Long Faces And Modified Longwall—High Pillar Recovery Made But Complete Extraction Of Coal Not Attempted—Successful Roof Action—Methods In Operation For Several Years

By G. B. SOUTHWARD

THE three reports—No. 2, No. 39 and No. 114—show mechanized mining on long faces or modified longwall where a fairly high recovery is made but where a complete extraction of the coal is not attempted. These operations illustrate a practice which is not looked upon with universal favor by mining men since it is generally held that pillars of coal left in a gob area will cause a squeeze or creep to develop. That this is a potential source of danger is not to be denied as there are many known cases where unmined coal has caused serious trouble of this kind. However, we also have many known examples of successful roof action in pillar recovery where a small percentage of coal has been left in the gob; as a matter of fact, it generally happens in room and pillar mining that some small stumps are lost and the only exception to this are those rare cases where a 100 percent pillar recovery is made. Therefore, experience in mining indicates that under certain conditions small pillars of coal can be left unmined in a gob area with some degree of safety but the amount of coal that may be left is determined by such factors as the strength of the coal, the character of the top and bottom rock strata and the manner in which these pillars are left.

In the mining methods which are shown in these three reports the coal which is abandoned is left in thin pillars and small stumps regularly spaced in the mined area. In these operations the managements have of course taken advantage of certain natural conditions which favor and permit the systems they are using and while it is by no means implied that these particular methods have a general application it is nevertheless probable that the principles which they illustrate may perhaps have a wider application than is popularly supposed. At any rate, it is interesting to know that these three operations are not confined to one seam of coal or even to one coal field. They are widely separated; one is located in Pennsylvania, one in West Virginia and the third in Indiana.

The plans developed by these mining methods are all based on the same general principle which is to leave pillars of sufficient size to afford a temporary support for the primary roof weight while mining is going on but not of sufficient size to resist the major roof weight which develops as the mining progresses

A successful roof action is held by many to be one of the most important if not the deciding factor in determining the success of a mechanical mining operation. This is particularly true in long face or modified longwall mining and some difficulties have been encountered in gaining a successful roof action under certain top conditions where a 100 percent pillar recovery is being attempted. These difficulties have led to the design of some long face systems where a small amount of coal is left unmined for temporary roof support and the accompanying reports show three examples of this type of mining. These reports are not submitted with the intention of recommending or suggesting that these mining methods have a universal application to all roof conditions. However, they do illustrate three very interesting methods of roof support and a study of these operations is suggested to those who are interested in the subject of long face or modified longwall mining.

over a panel. These pillars are so spaced that the roof between them can be temporarily supported on ordinary wood posts but these posts are subsequently crushed by the roof weight when the primary falls occur. As additional areas are mined the pillars are sooner or later subject to the major roof weight and as it is evident that these pillars are not of sufficient size or strength to support the total overburden, it necessarily follows that this weight must be relieved in some manner. Just how this relief occurs and how a state of equilibrium is established is to a large extent a matter of theory or conjecture. In certain cases, it has been fairly well proved that the small pillars crush down until the overlying strata come to rest on the fallen material resulting from the primary roof breaks. In other cases it can not be proven just what does occur but whatever the theory, the fact remains that these methods of mining have been used over large areas and for a period of several years without squeezes or creeps resulting.

In report No. 2 rooms 100 ft. wide are mined advancing as in ordinary room work with a pillar 25 ft. thick left between adjoining rooms. This pillar is cut by breakthroughs. While the room is advancing the top is supported on timbers but with the exception of setting the timbers and leaving the thin pillars, nothing further is done either to support the roof or to cause roof falls. After several rooms have been mined the top caves in the abandoned rooms, breaking on the pillars and the heading stumps. So

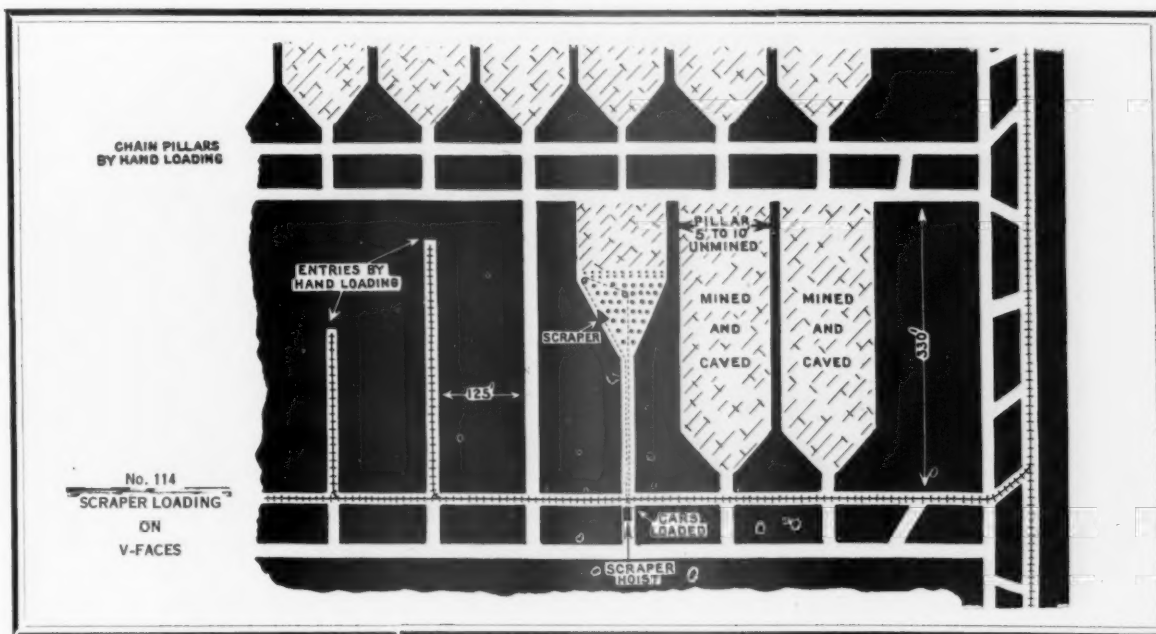
far these breaks have stopped at the room necks and while the heading stumps and chain pillars show some signs of heavy weight it is reported that they have always been sufficient to maintain the haulway. If the headings could not be held open this system would be worked retreating instead of advancing.

In operation No. 39 the mining is done by slabbing long faces and supporting the mined area on timbers until this area reaches an extent where the timbers begin to show weight and a roof fall is imminent. Two faces are worked on opposite sides to a block of coal 150 ft. wide and mine toward each other, gradually reducing the width of the block and continuing until only a thin pillar remains. This pillar is usually less than 10 ft. thick but the top in this mine is

rather strong and it sometimes happens that an entire block of coal 150 ft. wide between two lines of chain pillars is mined completely before a fall occurs. In this operation the length of the mined area is constant but the width is increased each day; in the other two operations the width remains constant while the length is increased.

In operation No. 114 the faces mine an area slightly more than 100 ft. wide working next to solid coal on one side and leaving a thin pillar about 10 ft. thick against the gob on the opposite side. The faces are angled so as to form a V and the space in the V is supported on timbers. As the mining progresses falls occur in the area behind the faces, breaking on a row of timbers which is set across the V at the end of the faces. When the V system was first started at this operation an attempt was made to recover all of the coal by cutting the end of the face through to the adjoining gob area but roof falls frequently come in along one or both of the faces and cause quite a little interruption to the mining. After some trial this method was discontinued and the present practice of leaving a thin rib of coal next to the gob was started. Since that time the roof action has been decidedly favorable and this favorable effect is undoubtedly due to the unmined pillars. It is reported that two years of successful operation by this system have mined out more than 60 acres of coal and that these pillars have not shown any tendency to cause a squeeze or a creep.

Report No. 114



PHYSICAL CONDITIONS: The seam is 4 ft. high of rather soft coal with 5 in. of impurities. Slate top which stands well in the workings. Hard slate bottom. Seam generally level but has local rolls. Cover 300 ft. Open lights.

MINING SYSTEM: "V" system retreating, with scraper loaders on the faces loading into mine cars. Entry development by hand loading in mine cars. Chain pillar recovery is partly by hand loading in mine cars, and partly by hand shovelling on light portable conveyors. Panels 400 ft. wide by 1,500 ft. long are developed by pair of entries with single entries on 125-ft. centers driven 330 ft. through to the headings in the adjoining panel. A pair of faces, each face 100 ft. long, is worked to the right and left off each single entry; the faces angling in toward the entry so as to form a "V" with a central angle of 45 degrees. Slab cuts are taken along the faces, keeping the central angle constant and mining retreating in toward the haulage entries. Only one pair of faces is worked at a time in a panel, mining out to the haulage entry before the next pair of faces in the adjoining single entry block is started. A thin pillar from 5 to 10 ft. in thickness is left unmined between each pair of faces.

MECHANICAL OPERATION: Scraper loaders are used along the faces, the scraper having a capacity of about 1,350 lbs. of coal and is operated by a double drum, electric rope hoist set in a crosscut along the haulage way. This hoist drags the scraper along the face where it collects the coal and thence down the single entry to the haulage where the coal is dumped from the scraper into mine cars. A tail rope pulls the scraper back to the face and the operation is repeated. When the faces have mined down to the haulage the scraper installation is moved and reset in the adjoining single entry.

A gathering locomotive delivers mine cars of 1½ tons capacity in 35 car trips to the scraper discharge on the haulway and moves the cars past the discharge point while loading in a solid trip. Track is laid on 36-in. gauge with 30-lb. steel rail. No track is used along the faces and the timbers and other supplies are taken in by the scraper.

DRILLING AND SHOOTING: The faces are undercut 6 ft. by machine; drilled by hand and shot with permissible explosive with electric firing. Shots are spaced 5½ ft. apart using 1¼ sticks of powder per shot and producing about 15 tons of coal per pound of powder used. The coal is fairly well broken down by the shooting so as to provide easy loading for the scraper, although some pick work is required at the face.

TIMBERING AND ROOF ACTION: A row of wooden posts about 6 in. in diameter is set on 6-ft. centers parallel to the face and about 7 ft. from the face after each cut is loaded out. No timbers are recovered and as the mining advances the weight in the area behind the end of the faces crushes the timbers and the top caves. These falls usually occur about 75 ft. apart as the mining progresses. Anticipating the falls, "breaker lines," consisting of a row of posts on 3-ft. centers, are set every 75 ft. across the "V" from one face to the other. These lines are started in the "V" and are extended each day as the faces mine out and the space widens. The roof generally breaks on and behind this line of timbers, leaving the faces and the space between the faces open and supported by the timbers. It has been found by experience that the dimensions adopted at this operation are such that their roof in the "V" can be held successfully on timber posts while the faces are being mined, and a high coal recovery has been obtained. It has also been found by experience that the thin pillar of coal left in next to the

gob has a decidedly favorable effect on the roof action.

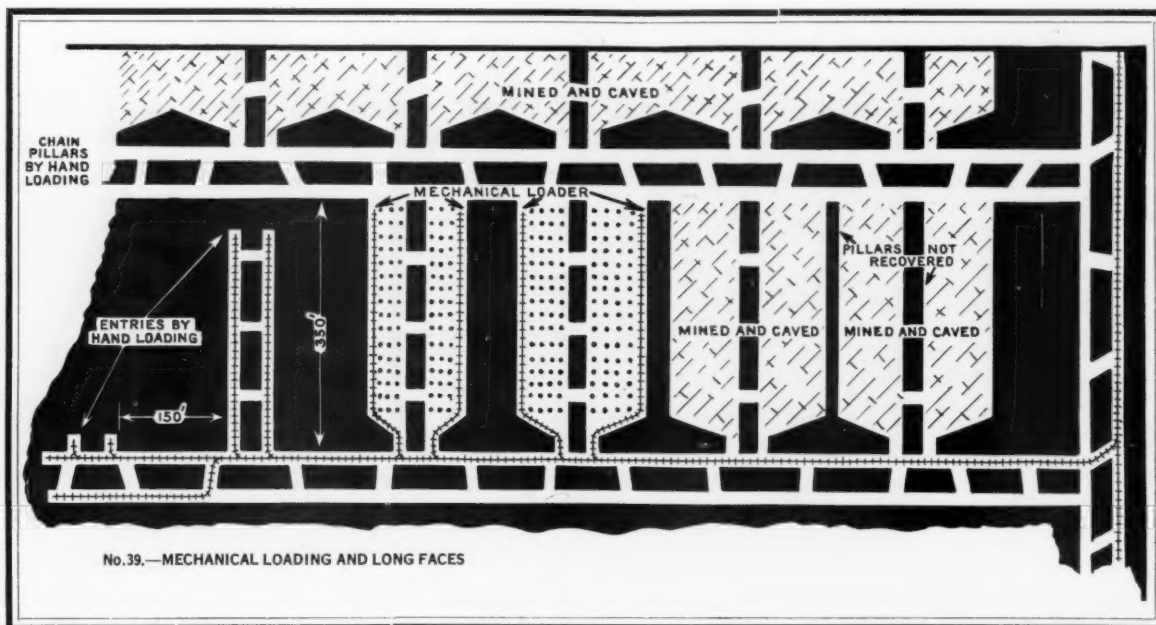
OPERATING CREW: Loading is on the day shift and cutting, drilling, timbering and other dead work on the night shift; both shifts 8 hours long. The day crew has 3 men on the faces who guide the scraper, clean slate and pick down any hanging coal; 1 signal boy, 1 scraper hoist operator, 1 car trimmer and 1 gathering motorman. The night crew has 3 men who do the cutting, drilling, timbering and shooting. This makes a total of 10 men on the regular crew, who load out a pair of faces and complete the operating cycle each day. A crew of 4 men for one shift is required to move and reset the hoist when the block is completely mined but this occurs only about once a month and is done on the night shift. Each face will produce about 70 tons of coal and an average of 140 tons is loaded from a pair of faces each day.

EQUIPMENT: Each pair of faces uses one scraper installation complete with electric hoist; 1 cutting machine, and 1 gathering locomotive.

PREPARATION: Some slate picking is done inside but the face loading has increased the amount of slate cleaned at the tipple by about 10 percent over hand mining. There is also more coal breakage from the faces than in the hand mining but the coal is of soft structure and no attempt is made to produce lump.

CONCLUSION: The mine is operated entirely on the scraper system and is producing about 75 percent of its output from the face and 25 percent from the development work. The scrapers have been in use at this mine for over two years and the management considers this a successful and satisfactory method of mining. They estimate that the mining area under development has been concentrated to about 40 percent of the area that would be required to produce the same daily tonnage by hand mining.

Report No. 39



No. 39.—MECHANICAL LOADING AND LONG FACES

PHYSICAL CONDITIONS: The seam varies from 6 to 7 ft. in height of hard structure coal with a slate and bone parting from 4 to 18 in. thick near the center of the seam. Strong slate top which stands well over large areas. Hard clay bottom. Seam nearly level—from $2\frac{1}{4}$ to 4 percent. Cover 300 to 400 feet. Open lights.

MINING SYSTEM: Long face advancing by mechanical loading on the faces, with hand loading in the entry development and chain pillar recovery. Panels are developed 350 ft. wide by a pair of headings with double cross entries on 35-ft. centers and spaced at 200-ft. intervals turned at right angles off the headings and driven through to the adjoining panel. This develops solid blocks of coal 150 ft. wide by 350 ft. long. These blocks are mined by long faces formed by slab cuts taken along the 350-ft. side starting at the cross entries and advancing toward the center of the blocks. These faces advance toward each other as far as the roof will permit, generally recovering all of the block except for a thin pillar less than 10 ft. thick in the center. No attempt is made to take the cross entry chain pillars. The faces are mined 250 to 275 ft. long, leaving a stump 25 to 40 ft. thick along the haulway as a barrier pillar. These stumps and the chain pillars along the haulway are later recovered by hand.

MECHANICAL OPERATION: One loading machine is used in a panel and four faces are maintained under development as the working territory for one machine operation. The loader works on caterpillars, traveling along the face and loading directly into mine cars of 2.4 ton capacity which are delivered in 15 car trips along a track paralleling the face. A gathering locomotive serves

the machine, moving the trip at the machine until 10 cars are loaded, at which time the locomotive takes these cars to the side track and returns with empties while the remaining five cars are being dropped past the loader by hand. A single track of 20-lb. steel on 32-in. gauge is used along the face and shifted forward after each cut.

The face is cut by machine, cutting in the parting and taking two or more cuts as the thickness of the parting requires. The machine cuttings are loaded by a small loading machine and gobbled in the mined area across the track. The coal is drilled by an electric drill mounted on a truck which is motor driven for traveling along the face. Permissible explosive is used with electric firing, shooting in both the top and the bottom coal above and below the machine cut before the loading operation is started. The coal is fairly well broken up so that very little digging is required by the machine.

TIMBERING AND ROOF ACTION: The roof is a strong slate which can be supported on timbers over fairly large areas in face mining. One row of posts varying from 6 to 12 in. in diameter is set after each cut, on 10-ft. centers parallel to the face and are left in place as the mining advances. As a rule an area 100 ft. wide and at times a greater width can be supported in this manner before a fall will occur. No timbers are recovered but are left in place until crushed by the roof weight. This system of mining and roof support has been carried on at this operation for a number of years, over large areas and the management reports that a very high pillar recovery has been maintained.

OPERATING CREW: The work is performed on two shifts of 9 hours each with all operations such as loading, cutting, drilling and shooting carried on continuously during both day and night

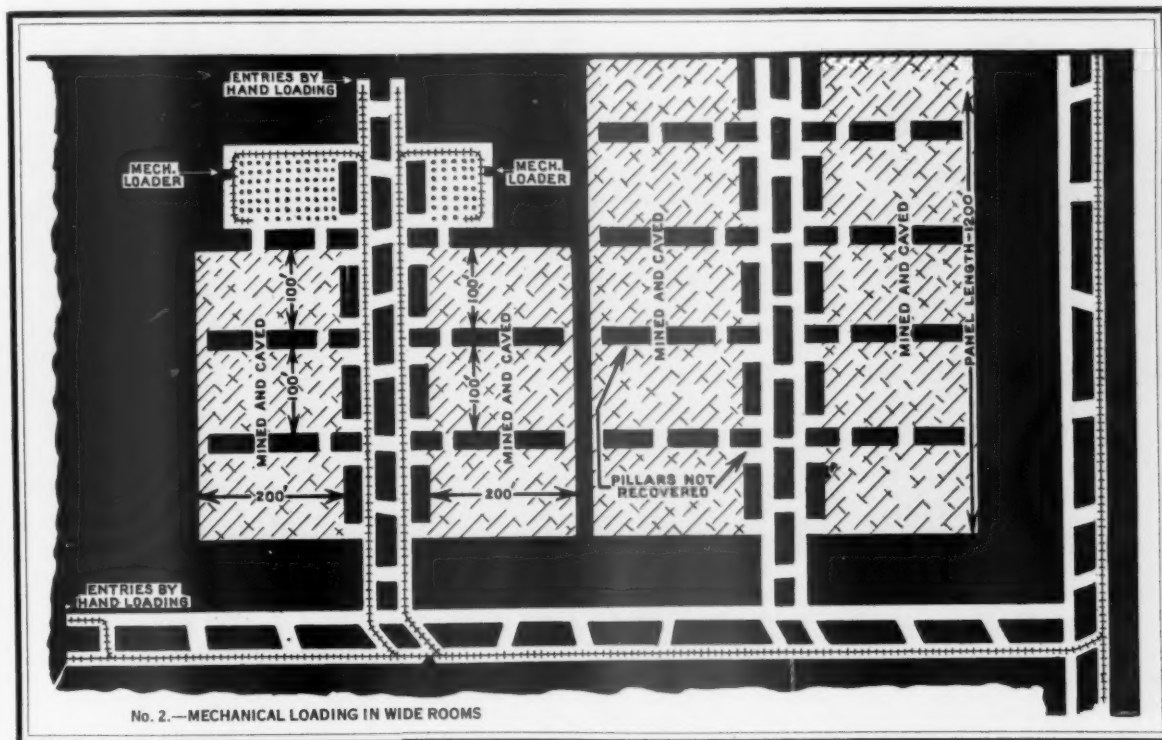
shifts. Four faces are kept under development so that while one face is being loaded the other operations are being performed on the other faces. Each shift has a crew of 14 men—1 coal loading machine operator, 1 helper, 1 gathering motorman, 1 brakeman who also acts as car trimmer, 2 cutting machine men, 2 operators for a small mechanical loader who gob the machine cuttings from the slate parting, 1 driller, 1 shot firer, 2 timbermen and 2 trackmen. One face cut will normally produce from 250 to 300 tons of coal but as the operation is continuous it is not necessary to complete the loading on face during a shift. The average tonnage mined per shift over a long period of operation shows to be between 175 and 200 tons.

EQUIPMENT: Each operating panel uses 1 coal loading machine, 1 cutting machine, 1 gathering locomotive, 1 small mechanical loader for slate and 1 electric drill mounted on trucks.

PREPARATION: The management reports that the percentage of lump coal obtained from the face is somewhat less than the lump obtained by hand mining but they feel that this can and will be corrected by more careful shooting. The coal is cut in the slate parting which is loaded out before the coal is shot down but due to inequalities in the thickness of the parting, the cutter does not remove this completely at all times. This has necessitated a slight addition to the hand picking required at the tippie over that required by hand mining.

CONCLUSION: This mining system has been in use at this operation for over 10 years using mine cars with hand loading on the faces. During the last three years mechanical loaders have been installed, and are now mining about 40 percent of the mine output. The management reports their operation as satisfactory and successful.

Report No. 2



No. 2.—MECHANICAL LOADING IN WIDE ROOMS

PHYSICAL CONDITIONS: The seam is 5 ft. high, hard coal with no regular partings. The top is a strong slate which stands well over large areas without much timbering. Hard bottom. Seam nearly flat. Cover 200 to 250 ft. Open lights.

MINING SYSTEM: Wide rooms advancing with mechanical loading in the rooms and with entry development by hand loading. Panels 500 ft. wide by 1,200 ft. long are developed by a pair of entries in the center and are worked by rooms 100 ft. wide and 200 ft. long driven to the right and left off the entry. The rooms are mined advancing and only one room is worked at one time off each side of the entry and is driven to the panel limit before the next room is started. The pillars between the rooms and the room neck stumps along the heading are 25 ft. thick. No pillars are recovered and a fairly high rate of extraction is had on the first mining.

MECHANICAL OPERATION: The rooms are turned off the entry with double room necks and are driven in by hand for a distance of 25 ft. and widened by driving across from one neck to another leaving a 25-ft. barrier stump along the heading. As soon as the room is widened the loading machine starts its operation and advances the room from that point to the panel limit, the machine remaining in the room and working one room only at a time.

The loading machine sets on the slate bottom and works across the face of the room discharging into mine cars on a track parallel to the face. These cars are of 2-ton capacity and are placed in

trips of from 5 to 10 cars by a gathering locomotive which moves the trip past the machine while loading. One locomotive is used with each loading machine operation. A single track of light steel on 42-in. gauge is laid up one side of the room and across the face.

The coal is machine undercut 6 ft. drilled by an electric hand drill, and shot with permissible explosive and electric caps. The shots are spaced from 7 to 8 ft. apart and produce about 15 tons of coal per pound of explosives used. It is the intent in shooting to loosen and shatter the coal in a standing shot so that more or less digging is required with the loading machine.

TIMBERING AND ROOF ACTION: Wood posts 6 to 7 in. in diameter are set on 5-ft. centers in 6-ft. rows as the room advances; the first permanent row being about 25 ft. from the face. Between this and the face where the machine is working, temporary timbers are set and moved as required to provide operating clearance for the loading and cutting machines. No timber is recovered and no attempt is made to cause roof falls. The top stands well in the mined area and generally does not fall until some time after the room is completed and abandoned. These falls seem fairly complete, breaking in the room necks and apparently not crushing the stumps and chain pillars along the heading to any great extent.

OPERATING CREW: All face mining, except the shooting, is done during the day shift of 8 hours by a crew of 7 men;

3 on the loading machine, 2 on the cutting machine, 1 timberman and 1 motorman. On the loading machine 1 man operates, 1 man works at the face picking down coal and shoveling and 1 is at the discharge end trimming the mine cars as loaded. This man also acts as trip rider when the locomotive is changing cars. The cutting machine follows directly behind the loader with a crew of 2 men. Timbers are set by 1 timberman behind the cutting machine as it works across the face. One face 100 ft. wide is cleaned up during each day shift by the loading machine, producing from 100 to 125 tons.

EQUIPMENT: Each room uses one mechanical loader, 1 cutting machine, 1 gathering locomotive and 1 electric hand drill.

PREPARATION: No hand cleaning is done at the working face and although the seam is normally clean, small partings at times occur in the coal. This has increased the number of slate pickers on the tippie by 50 percent over the number required for hand mining. The capacity of the picking tables and the refuse disposal facilities was also increased.

CONCLUSION: This mechanical mining system has been in use for over a year and the mine is now almost completely mechanized. The management considers this a successful operation and it has greatly concentrated the mining area and reduced the number of working places formerly required for the same daily tonnage by hand mining.



COAL

PRACTICAL OPERATING MEN'S DEPARTMENT

NEWELL G. ALFORD, Editor

*Practical Operating Problems of the
Coal Mining Industry*



BELT CONVEYOR TRANSPORTATION of COAL*

Long Distance Transportation Of Coal By Means Of Belt Conveyor, Inaugurated By Frick Company In 1924—Splendid Production And Safety Records Have Been Established Through Its Use—Maintenance Cost Has Been Small and System Regarded As Entirely Successful

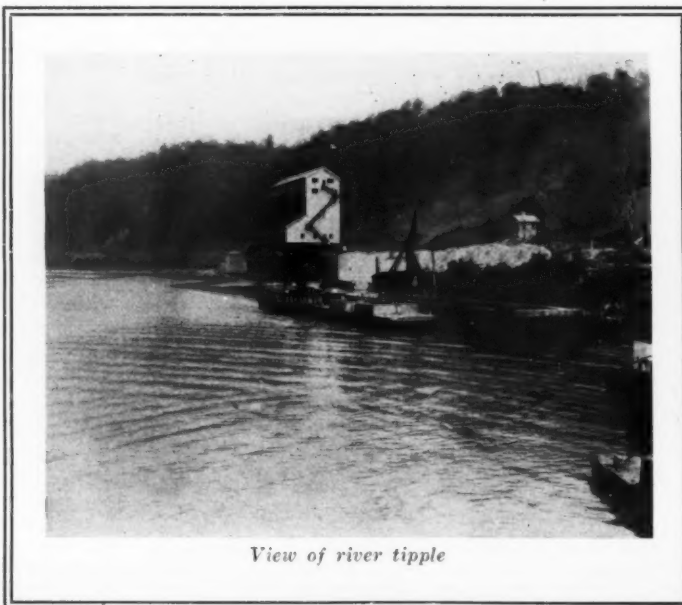
IN this discussion of Belt Conveyor Transportation of Coal, main conveyors carrying large tonnages will be considered. Belt conveyors have been used to transport coal for short distances for a long time and are a well known and generally used means of transportation where only one or two units are required to move the coal from one step in its preparation for market to the next, or to load it into either railroad cars or barges on the river for transportation to the consumer. The H. C. Frick Coke Co. has four such belt conveyors in operation now at its Bridgeport, Palmer, Gates and Ronco mines. Long distance transportation of coal by means of belt conveyors had not been tried, however, until the H. C. Frick Coke Co. put into operation its

By E. C. AULD†

conveying system at Colonial Dock in 1924.

Early in 1919 it was decided to increase the capacity of the Clairton By-Product Coke Plant, requiring an addi-

tional daily supply of 8,000 tons. As the H. C. Frick Coke Co. had no other mines lying directly on the river, it became necessary to bring coal from farther back than ever before attempted. The Colonial Nos. 1, 3 and 4 mines were selected and an outlet provided through the old Alice mine, purchased from the Pittsburgh Coal Co. for this purpose. This required transporting all coal from each of the mines selected an average distance of about six miles to the river. A belt conveying system about 4¼ miles long was provided and the coal from the three mines concentrated at one dumping point for delivery to this system. This location of the dump allowed the locomotives to haul the coal a sufficient distance on its way to the river to give them all the work they could do economically. The coal from all three mines is handled by two pneumatically operated rotary dumps, each 374 ft. long so



View of river tipple

* Presented at joint meeting of the Pittsburgh Section of the American Institute of Mining and Metallurgical Engineers, and Engineers Society of Western Pennsylvania, Pittsburgh, Pa., October 20, 1927.

† Chief Mechanical Engineer, H. C. Frick Coke Co., Scottdale, Pa.

as to handle an entire trip of 35 cars at a time. They were designed to dump 4,000 cars per day. These dumps discharge into a bin beneath them. This bin has a capacity of 1,250 tons, or about an hour's storage at the rated capacity of the conveying system. The coal is fed from the bottom of the bin by 34 apron feeders, which all operate together, delivering coal to a 60-in. belt underneath, which runs at a speed of 350 ft. per minute. All the remaining 18 units reaching from the dump to the river are 48-in. wide and run at a speed of 500 ft. per minute.

These conveyors were designed to handle 1,220 tons per hour, or about 8,500 tons in 7 hours. As this system has been described pretty thoroughly several times and, no doubt, many of you have seen it in operation, I will not enter into any detail description here. A few figures might be interesting in order to keep in mind the size of the conveying system. Its total length is 22,930 ft., divided into 19 individual conveying units, of which the longest is 2,439 ft. and the shortest is 321 ft. center to center of head and tail pulleys. The longest conveyor has a net lift of 8.45 ft. and is driven by a 150 hp. motor. The total lift from the tail pulley of the last conveyor inside the mine to the head pulley on the conveyor in the river tippie is 353.32 ft. Only one conveyor operates on a down grade. The greatest lift on any conveyor is 43.42 ft., the length of this conveyor being 786 ft. The next lift to this is 29.64 ft. on a conveyor 1,320 ft. long. The entire system requires about 47,000 ft. of belt, 6,500 troughing carriers, 2,280 return carriers, and a little over 40,000 anti-friction bearings.

This system was completed and put into regular operation April 12, 1924. It carried 1,265,909 tons of coal in 1924, 2,856,431 tons in 1925, 2,964,740 tons in 1926, and to October 1, 1927, 2,303,539 tons. This makes the total coal carried to October 1, 1927, 9,390,619 tons. The record month was March, 1927, with 289,047 tons in 27 operating days, or an average of 10,705 tons per day. In September of this year the system carried 263,165 tons in 22 operating days, or an average of 11,962 tons per day. The record for a single day's operation was made January 15, 1926, when 13,866 tons were carried. The record day's dumping was made September 30, 1927, when 6,415 mine cars were dumped. As this system was designed to dump 4,000 cars and carry 8,500 tons per day, we can say it has more than justified our expectations.

While these records are very satisfactory, we have another of which we are very proud. This is our accident record.

Conveyor Number	Capacity Tons Per Hour	Size of Belt	Length in Feet Center to Center	Lift in Feet	H. P. Power Level Run	H. P. Power Lifting	H. P. Power Total Running	Total Running H. P. Input Motors	Size of Motors	Belt Tension Running Load	Length of Belt Required	Number of Carriers	Number of Return Rollers
1	1800	60"-9 Ply	346	81.04	27	157	184	246	300	16300	742	97	36
2	1800	60"-9 Ply	374	105.09	29	204	233	312	300	18000	798	103	38
3	1800	60"-9 Ply	476	95.73	34	182	216	290	300	18700	1002	134	48
4	1800	60"-9 Ply	1844	24.40	97	47	144	193	200	12800	3760	508	183
5	1800	60"-8 Ply	2217	16.88	115	32	147	196	200	13000	4906	611	220
6	1400	48"-8 Ply	1846	37.76	77	95	132	176	200	11900	3762	476	183
7	1400	48"-8 Ply	1970	28.80	82	41	123	165	175	11300	4010	509	195
8	1400	48"-8 Ply	1675	41.47	72	99	131	175	175	11800	3420	433	165
9	1400	48"-8 Ply	1965	29.88	82	45	125	167	175	11400	4000	507	195
10	1400	48"-8 Ply	2010	25.59	82	37	119	159	175	10900	4090	519	200
11	1400	60"-8 Ply	675	37.36	40	94	94	125	125	12000	1440	191	70
12	400	42"-6 Ply	303	40.82	17	50	47	65	75	6500	685	115	30

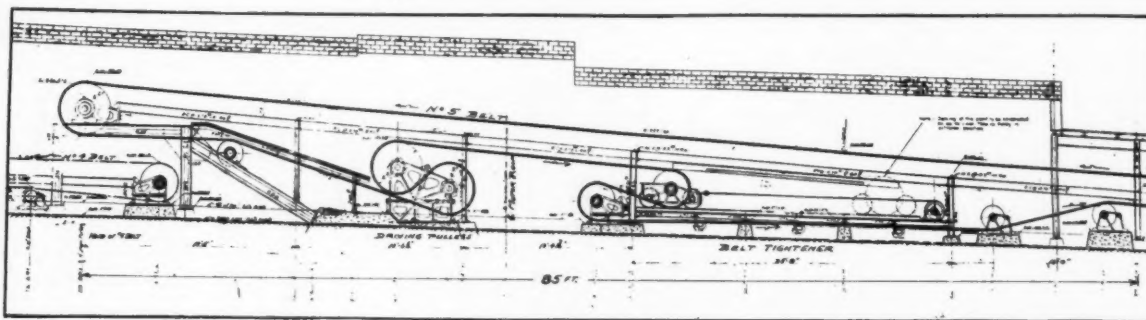
In all this period of operation we have a total of only three minor accidents to charge against this system, and only two of these occurred while the system was in operation. In August, 1924, a repairman, in preparing a belt for splicing after the day's run was over, had a knife slip, cutting his hand. He lost 19 days time. In January, 1925, a tippelman ran against a shaft projection on one of the shuttle conveyors, bruising his right eye. He lost 3 days time. In July, 1925, a belt patrolman had the fingers of one hand caught between a belt scraper and the belt. He lost 6 days time. This makes a record of 9 man-days lost time due to accidents during operation, and a total of 28 man-days lost time on the entire system for a period of a little over 3 years and 6 months, with over 9,125,000 tons of coal carried a distance of 4.3 miles.

Delays in operation are another important element in any method of transportation. We have kept a complete record of every delay on the system since the start of operation. In the figures I am giving you, no account has been taken of any delay of 15 minutes or less, as such a delay is not sufficient to have any influence on the output for the day. The storage under the dumps easily takes care of any delay up to 25 minutes after the system has operated the first hour in the morning. Such a delay in the first hour may hold up dumping of coal due to the fact that the bin is usually filled up during the night. We have had a total of 24 delays due to the chutes being clogged, amounting to 20 hours and 30 minutes; 10 delays due to belt splices breaking amounting to 12 hours and 5 minutes; 7 delays on account of electrical trouble amounting to 7 hours; 4 delays on shuttle conveyors amounting to 3 hours and 20 minutes; and 5 delays of a miscellaneous nature, amounting to 2 hours and 30 minutes. This makes a total of 50 delays amounting to 45 hours

and 25 minutes, or a little over 5½ days in slightly over 3½ years. In this list of delays 10 have been of one hour and over. Very few of these delays have resulted in any loss in output for the day. On April 15 of this year, we had a delay of one hour and the system carried 12,090 tons, and on May 2 with a delay of 2 hours and 50 minutes, it carried 12,127 tons for the day. The delays on account of breaking belt splices came in the early operation of the system. When we started operating we had one mechanical splice in each belt. We have since vulcanized all belts endless and overcome this source of delay. The clogging of chutes is now the most serious disturbance to operation. We have largely overcome this by putting a flapper in each chute to operate a switch which closes down all motors behind it as soon as it is moved. This flapper is placed just above the normal flow line of the coal and as soon as coal starts to pile up, the switch is thrown, shutting down all the system back of where the trouble develops. This clogging of chutes is mainly due to pieces of mine timbers being carried through and turning on end or crosswise in the intersection chutes. With all the safeguards we have been able to devise, this is still a source of trouble.

The maintenance has been very small. Fifty-seven percent of the original belt is still in service. Out of over 40,000 bearings, less than a hundred have been replaced. All carriers, pulleys and drives are in fine condition. None of them shows any appreciable wear. All intersection chutes have been renewed once and a few the second time. They require more care to keep the belts properly loaded than anything else on the system.

This system carries nearly a full load on the belts most of the time, and practically no coal is spilled along the way. This is due to the chutes all being adjusted properly. This required consid-



Head of No. 5 Belt Showing Driving Pulleys and Belt Tightener

erable adjustment when the system was first started. After all adjustments were made and the coal being handled almost perfectly, we made careful measurements of each chute and when the time for renewal came, expected to replace them without any more adjustments being necessary. The new chutes were very nearly right but not a single one functioned properly without adjustment. We now make the bottom plates of these chutes adjustable so they can be changed to suit conditions. A change in the sizes of coal carried often necessitates readjustment of chutes.

Nothing in an entire system of this kind requires more careful design than the intersection chutes. They must be perfectly adjusted if the belts are to carry a full load. Their proper design also keeps down breakage of coal and belt wear to a minimum. We have always claimed that there is practically no breakage of coal on this system from the feeders under the dump to the end of the system at the top of the river tippie. In order to prove this, on June 2, 1925, an ordinary pasteboard carton containing a dozen eggs was placed on top of the coal on Belt No. 19 and conveyed through to the No. 1 conveyor at the river front, where it was taken off without a single egg being broken. On the same morning another carton of exactly the same kind, containing a dozen eggs, was buried underneath the coal on No. 19 belt and conveyed from this point to the No. 1 belt, where, upon examination, it was found that the box was still under the coal in about the same position as placed at No. 19, with one egg broken, one slight cracked and the other 10 whole.

This system has operated so successfully that when it became necessary a little over a year ago to make preparations for a further increase in river tonnage there was no question raised as to the method of transportation to be adopted. The inland mines at Filbert, Footedale and Buffington were selected to supply river coal. These mines are being consolidated with Lambert, Ralph and Palmer, which are already delivering coal to the river through the Palmer

shaft, to deliver a combined output of 12,500 tons per day at a new river loading plant to be known as Palmer Dock. The present Palmer river loading plant will be abandoned, the coal now being loaded there being handled over the new system. This new installation will be very similar to the Colonial Dock system. While the new system is designed for a much larger tonnage, it is not as long as the Colonial Dock system. Its total length is 15,398 ft. and the total lift is 522 ft. The entire plant has been designed in accordance with data secured at Colonial Dock.

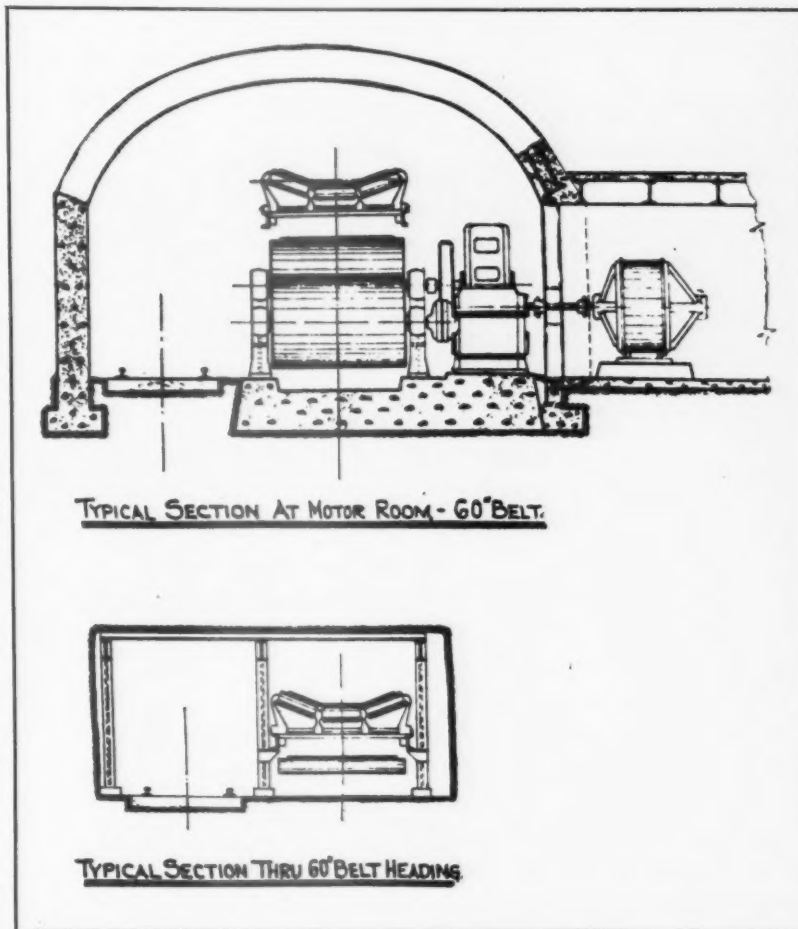
Storage is provided at both of the dumps in order to allow mine cars to be dumped promptly and returned to the working face. At the main dump we are providing 1,400 and at Palmer 175 tons storage beneath the dumps. It is necessary to dump a trip of mine cars every 5 minutes regularly at the main dump in order to keep the belt system operating at rated capacity. The landing arrangements, however, are such that a trip can be dumped every 2 minutes if the coal is available. If we started with an empty bin and dumped steadily at the rate of one trip every 2 minutes, it would be 38 minutes before the bin would be full and we would have handled 19 trips, and 5 minutes later would be ready for another. Eighty-four trips must be dumped each day and if handled at the rate of one trip each 5 minutes the work would be accomplished in 7 hours. All equipment throughout has been designed to do the work required in 7 hours, so as to provide for an hour of lost time any day without reducing output.

The ratio of storage to output is twice as high at the main dump as at the Palmer dump, but the Palmer dump has a provision to double the rate of withdrawal from the bin whenever the feed from the main dump decreases sufficiently to allow the belts to carry the load. This makes them nearly even in operating advantages.

The conveying system consists of 12 units. The manner of numbering is the same as at Colonial Dock, the No. 1 unit being at the river end and numbers run-

ning consecutively back to No. 11 under the main dump. The No. 12 unit feeds the coal from the Palmer dump to the No. 5 belt on the main line. The No. 12 unit is to carry a regular load of 400 tons per hour, this being doubled whenever the main conveyor can take the additional tonnage. This is a 42-in. belt, operating at a speed of 500 ft. per minute. It is located at right angles with the main conveyors. The first three units of the system are to operate on a vertical angle of 17° 21'. The No. 1 conveyor reaches from the slope mouth to the top of the river tippie. It is the only conveyor operating outside. The Nos. 2 and 3 units are in the slope from the surface to the coal seam. This slope is 651 ft. long, with a vertical angle of 17° 21'. There are only two horizontal angles on this system—one at the intersection of Nos. 3 and 4 units and one at Nos. 1 and 2 units. The first five conveyors are 60 in. wide to carry 1,800 tons per hour. Nos. 6 to 10, inclusive, are 48 in. wide, and No. 11, which is located under the main dump, is 60 in. wide. No. 11 conveyor operates at a speed of 350 ft. per minute on account of its being a feeding belt. All other conveyors operate at a speed of 50 ft. per minute. All units from No. 4 back are mechanically interlocked in the same manner as at Colonial Dock so as to prevent one unit coasting farther than another when a stop is made. This system is calculated to coast 40 ft. when the power is shut off. This coasting will be readily controlled by the mechanical interlock on all conveyors on the regular grade of the coal seam, but this could not be done on the slope units. These units are provided with flywheels on the drives, and No. 3 provided with stored energy to carry it 50 ft.; No. 2, 60 ft.; and No. 1, 70 ft. This requires a stored energy of 500,000 ft. lbs. on the No. 3 unit; 950,000 ft. lbs. on the No. 2 unit; and 950,000 ft. lbs. on the No. 1 unit. These three units require 60-in., 9-ply belt in order to take care of the additional stresses, while all the balance of the system, with the exception of No. 12, is fitted with 8-ply belt; No. 12 conveyor is 42-in., 6-ply belt.

The only radical change in the design of this conveyor system, as compared with the Colonial Dock system, is in the head, tail, snub and drive pulleys. On this system we are making all pulleys flat face, absolutely eliminating crowns. This was not attempted until the theory had been proven at Colonial Dock. About 18 months ago we changed all pulleys on the Nos. 8 and 9 unit at Colonial Dock, which has a total length from head to tail pulley of 2,439 ft. We started in removing the crown from one pulley at a time, the first made flat being the head pulley. As soon as this had been tried, the drive pulleys were changed, following with all the snub pulleys in order, and finally changing the tail pulley. After this conveyor was completely equipped with flat-face pulleys, we found that the belt ran exactly the same as it had when it was running over the crown pulleys. We were not able to observe any change in belt alignment. We have since changed several other pulleys on the system and intend to turn down all pulleys on this system, making it completely equipped with flat-face pulleys as soon as convenient. By using flat-face pulleys we expect to get considerably better service out of belts. On pulleys of the sizes to be used on an installation of this kind, it has been ordinary practice to use at least a $\frac{3}{4}$ -in. crown, this being what was used at Colonial Dock. With a $\frac{3}{4}$ -in. crown the circumference at the center of any pulley is 4.7 in. larger than at the rim. Taking the case of a 48-in. pulley with a $\frac{3}{4}$ -in. crown, if we allow for a 200-degree belt contact, the 7 ft. of belt in contact with the pulley must stretch a little over $2\frac{1}{2}$ in. at the center if the entire belt comes in contact with the surface of the pulley. This necessarily throws the main driving strain on the center 6 inches of any conveyor belt, and we believe this contributes much more largely to the center wear of belts which is pretty generally noticed on most conveyors than does the abrasion due to loading and carrying of the load. With a flat face pulley we are able to get practically a uniform belt tension throughout the entire width of the belt, and by so doing we expect to get considerably better service out of the belt. We found from observation on the Colonial Dock system that in a good many cases the outside of the belt does not even contact with the driving pulley until such a time as the center has been pulled to such a point that the strains are transferred to the outer edges of the belt. In other words, a crown naturally tends to stretch the center of a belt so as to make the center of this belt considerably longer than the outer edges, to accommodate the crown. This can not be accomplished without over-straining the center of the belt and leaving it weaker than its edges.



We have never had any trouble whatever in training the belts over flat pulleys at Colonial Dock and do not expect to have on this new installation. The troughing carriers, we believe, will do all the training that is required without any assistance from the other pulleys.

Two cleaning brushes are provided for each unit of the system, these brushes being driven by small individual motors. As the coal to be carried will be fairly wet, we expect to have a considerable amount of small particles of coal brushed off each of these belts into a box provided at the brushes for the particles removed. After the box has become partly filled, the coal will be shoveled onto the main conveying belt by one of the belt patrolmen, this being part of his regular duties.

This system requires 2,542 linear feet of 9-ply, 60-in.; 9,706 ft. of 8-ply, 60-in.; 19,282 ft. of 8-ply, 48-in.; and 385 ft. of 6-ply, 42-in. belt; 800 large high-duty Hyatt roller bearings; 31,300 No. 204 and No. 304 ball bearings in carriers; 2,880 48-in. and 1,810 60-in. troughing carriers; and 1,000 48-in. and 580 60-in. return carriers.

The extreme belt tension on the system will be on the No. 3 unit, where the

stress will be 30 pounds per inch per ply. The balance of the system averages about 28 pounds per inch per ply. In installing the belts on this system, it is intended to vulcanize all but one splice on each unit, leaving one mechanical splice until such time as the belts have stretched. As soon as the initial stretch is taken out of these belts, it is intended to vulcanize them endless.

From our experience with the Colonial Dock conveying system, we believe there is no question as to belt conveyors being very economical means of transportation of coal over a long distance. In order to be economical, however, it is necessary that the tonnage be large. Any system to operate over 4 miles underground should have a capacity of not less than 8,000 tons per day, and double this would be better from the standpoint of economy. Any main-line conveyor should carry as nearly as possible the full load throughout the entire time it operates. Seventy-five percent of the operating cost goes on while belts are running idle, and a few more tons per hour on a belt cost practically nothing. An underground conveying system costs over twice as much to install as the total cost of all

the equipment involved. Grading, heading protection and drainage are expensive in an installation of this kind, and on a main-line conveyor it is not advisable to leave any question as to the stability of the roof. We believe a belt conveyor system can be built on the surface, complete, for not over two-thirds of the cost required underground. This means that an outdoor system can be $1\frac{1}{2}$ times as long as an underground system and still operate with the same economy. We do not believe that we have nearly reached the extreme length to which a system can be built and operated economically. In each of the two cases here treated the length of the conveying system has been established wholly with reference to the distance the coal could be transported from the face by the necessary locomotives so as to get economy from the locomotive haul. We do not doubt that there will be much longer conveying systems built in the future as it becomes necessary to move coal to the river from farther inland. River coal is not now necessarily located directly along a river.

Whenever a system of mining can be developed which will produce 5,000 tons of coal per day from a small area and without a large amount of development headings, there is no question but that this tonnage can be transported by long main-line conveyors from just back of the face of the tippie outside at a decided saving over the handling of this coal by locomotives.

It would be a very difficult matter to design any system, using belt conveyors for transportation of coal instead of mine wagons and locomotives, in workings which had already been developed for mining by present methods. We believe, however, that where a new piece of coal is to be developed it might be possible to design a successful conveyor installation for the handling of all the coal in the field. This would be an ideal mine. The coal would leave the working face with only one handling and be in motion from the time it was lifted from the floor until it arrived at the tippie. There would be no delays due to waiting for mine wagons, but all places would be cleaned up as fast as the coal could be handled after once being shot down. To develop such a mine, however, another new system of conveyors must be perfected. Up to the present time only the main-line conveyor can be considered as satisfactorily developed. The feeding lines would have to be light and easily handled, and a much larger tonnage would have to come from each individual working section than has heretofore been accomplished or the conveying system would be so cumbersome as to defeat its own end. Even if such a scheme is not developed and perfected, there still re-

mains a large field for the use of belt conveyors of the class already proven. There are undoubtedly large numbers of mines that could be advantageously consolidated, delivering their combined tonnages underground to a common point, where a large tonnage could be transported by belt conveyors to an outside loading point on either river or railroad. By such consolidations, large savings can be accomplished by doing away with the small hoisting and loading plants, allowing one crew of men to perform the work which has in the past been done by six or more crews. A dumping point such as the one provided for the Palmer Dock conveying system can be operated with less than half the men required at the bottom of the Palmer shaft at present, where less than half the tonnage is being hoisted. This simply points out one of the economics to be effected, while many more are possible and can easily be seen on a little investigation.

The sinking of a slope from the surface of the ground to the coal seam is in most cases not sufficiently expensive to have any considerable influence on the final analysis of a scheme for consolidating mines, and it will probably be the policy of the future to bring the coal to the surface as near as possible to the concentration point selected underground, delivering it from this point overland to its final destination. This is on account of the fact that conveyors can be built much cheaper on the surface than they can underground.

In both the consolidations we have made to date the underground routes were pretty well provided and the topography of the country made it very difficult to find a direct overland route to the river. Wherever a route of this kind can be laid out, without extreme difficulty however, it would be advisable rather than adopting an underground route.

Regarding the design of a transportation system of this kind, our experience shows that it is safe to say that the system can be operated economically if its installation cost is not high enough to run the sinking fund charge above 6 cents per ton on the tonnage to be carried. By sinking fund, in this case, we mean simply the charge against the plant which would return the money expended at the end of the estimated life of the plant. This, of course, depends on the system being so designed as to stand up well under operating conditions so that repairs and maintenance are not overly high. Belts can be expected to carry anywhere from eight to ten million tons, and all other machinery in connection with the conveyors should be readily kept up for at least 20 years without any very high replacement costs. The main renewals required are chutes, belts, and carrier bearings. The labor cost will

be low and accidents held down to a minimum.

While the conveyors we have been describing are not small, we believe that belt conveyor transportation of coal has really just started.

LEGISLATIVE REVIEW

(Continued from page 893)

tery companies and burial associations to lease or convey coal and other minerals, the funds to be used by these organizations for the maintenance of their properties.

Act of May 4, 1927, repealing the act of May 10, 1881, providing for conveyance of persons injured in mines to their homes.

Act of May 4, 1927, repealing the act of June 13, 1883, for the health and safety of persons employed in bituminous mines.

TEXAS

Act authorizing persons, firms, corporations, limited partnerships, joint stock or other associations operating or constructing aerial or other kinds of tramways between mines, smelters and railway, to acquire rights of way by condemnation. The act declares these persons and associations to be common carriers under the jurisdiction of the railroad commission.

WASHINGTON

A measure was before the legislature to make it optional for a mining company, if it desires, to qualify under the blue-sky law of the state. At present, mining is exempt from regulation under the blue-sky act.

WISCONSIN

The Legislature submitted and the people ratified a proposed amendment to the state constitution to allow forests and mineral lands to be taxed on a different basis from other property, but no legislation has yet been passed to carry out this measure. The constitutional amendment provides: "The rule of taxation shall be uniform, and taxes shall be levied upon such property with such classifications as to forests and minerals, including or separate or severed from the land, as the legislature shall prescribe."

The Senate branch of the legislature defeated a bill for the taxation of mineral reservations distinct from the land to which they apply.

WYOMING

Bills providing minor changes in existing laws relating to coal mining were passed.



ROCK LOADING OPERATIONS at TWO PENNSYLVANIA MINES

By HAROLD J. SLOMAN*

A LARGE coal company is operating loading machines at two of its mines in Pennsylvania, but in both cases the work is confined to the loading of rock and refuse. The two mining operations are located in Somerset and Fayette Counties. Both of these mines are classified as gaseous under the Pennsylvania Mining Laws and while the organization was in the market for loading machines, their requirements were not only sturdy construction but also permissible type of motors and electrical controlling parts. The company purchased for each of these mines a Myers-Whaley shoveling machine which is manufactured by the Myers-Whaley Company, Inc., of Knoxville, Tenn.

The Myers-Whaley organization briefly describe this shoveling machine as follows:

"The Myers-Whaley shoveling machine consists of an automatic shovel, mounted on the forward end of a swinging jib, which is pivoted at its rear end to the main frame of the machine. This jib section carries an armored belt conveyor, which receives the material from the automatic shovel and delivers it to a second armored belt conveyor, mounted upon a rear conveyor which is also pivoted for lateral movement at the same point upon the main frame. The truck wheels carrying the machine are driven by a reversing clutch, worm and

chain drive, so that the machine can be moved forward and backward at the will of the operator. The operator is mounted upon a small platform at the right hand side of the jib section so that he can see the shovel and guide its movements. There are only two levers used in the operation of the machine; one of these controls the forward and backward movement of the whole machine, the other controls the swinging of the jib section. These two movements give complete control and enable the operator to direct the shoveling machine the same as a man would direct a hand shovel. By means of a lateral adjustment of the rear conveyor the machine may load cars directly in the rear of it or into cars standing on parallel tracks."

The rugged construction and ability to accomplish rated capacities of the Myers-Whaley shoveling machines had never been questioned but they could not have found a market in the gaseous mines of Central and Western Pennsylvania coal fields until they were equipped with motors and other electrical parts permissible in gaseous and dusty mines. It is worthy of note that Approval No. 127 has been issued by the United States Bureau of Mines for explosion proof equipment as manufactured by the Myers-Whaley Company; this approval was issued on July 16, 1926.

No. 1 MINE

The No. 1 Mine is located in Somerset County, Pennsylvania. It is a shaft operation, gaseous mine, working the

During A 5-Month Working Period Of 94 Days 3558 Cars Of Rock, Slate And Fire Clay Were Loaded At One Mine, And At Second Mine 2291 Cars Of Rock Were Loaded In 70 Days—Brief Review Of Shoveling Machines In Entry Grading And In Removing Falls

Fig. 2.—Photograph showing a No. 3 Myers-Whaley Shovel taking bottom

C-Prime seam of coal, known also as the Upper Kittanning Seam and locally as the Cement Seam. The coal thickness averages 4 ft., the roof is principally shale and the bottom is slate and hard fire-clay.

There is installed and operating at this mine a permissible type of Myers-Whaley shovel, Special No. 3 size. The specifications for this machine are as follows:

Weight—13,500 pounds in working order.

Length—24 ft.

Width over all—4 ft. 8 in. (5 ft. at operator's platform).

Height—3 ft. 9 in.

Wheel base—36 $\frac{3}{4}$ in.

Track gauge—42 in.

Reach—9 ft. to each side from center of the track.

Width of shovel—34 in.

Power consumption—About 10 H. P.

Motor—15 H. P. for 250 or 500 volts d. c.

Maximum capacity—35 cu. ft. per minute in loose material.

This machine is used to load rock in grading entries now principally confined in No. 1 Mine to the Main Dip Section. The Main Dips are a 5-entry system, 2 of which are haulage roads. The grading, however, is being confined at present to one of these roads. The grade varies from 6 to 12 percent downward and is by no means uniform; sometimes top, bottom or both are shot and loaded. The entries are driven 10 ft. wide and from 6 to 7 ft. high. The coal has been extracted for some distance ahead of the grading operation usually 1,000 ft. or more. Not much water is encountered which is a particular advantage where the fire-clay bottom appears. Drilling

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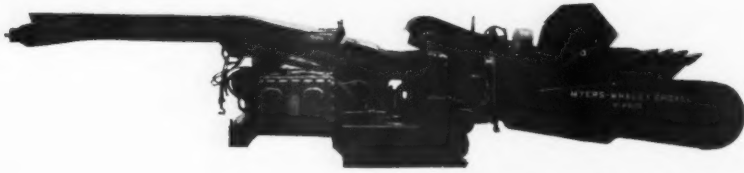


Fig. 1.—No. 4 Size Myers-Whaley Shovel in use in No. 2 mine. One of the first of this size using Government Approved Equipment for use in gaseous mines

and shooting preparatory to loading are accomplished on a separate shift. Usually 2½ ft. holes are drilled and cuts of from 3 to 15 ft. are shot depending upon the character and thickness of the rock. Where the top is shot, the permanent rail is laid prior to shooting or loading and naturally in standard rail lengths. With bottom shooting, the advance is slower for the rail must be laid as the machine advances. The shoveling machine crew lays rail sections of 6 to 8 ft. where bottom rock is loaded; this is later replaced with permanent track. The machine generally loads rock with the cars directly at the rear. Figure 2 shows a Myers-Whaley shovel loading bottom rock into mine cars placed directly behind the rear conveyor; this is the position of loading most commonly practiced. Note the large pieces of rock that the shovel can handle indicating that compared to hand shoveling much less sledging is necessary. The cars are handled singly by a 6-ton gathering locomotive, which switches, empties and loads at a side track kept from 80 to 150 ft. away from the machine. When top rock is shot and is to be used for filling, the shoveling machine is used to spread and fill the material and load out the excess. The track is in this case raised by blocking or cribbing before filling is done.

During a recent 5-month working period of 94 working days, 3,558 cars of rock, slate and fire-clay were loaded or an average of almost 38 cars per day; the car capacity averages 2 tons of rock. In addition to this the machine was used considerably for filling-in. For the same period, the labor charges were \$6,886.21 or \$1.93 per car. However, the loading crew laid the permanent haulage track and filled in for grading, hence these items would have to be deducted to arrive at the actual labor cost per car of rock loaded. Viewing the operation from another angle, on a basis of 6,000 cu. yds. of roof and bottom excavated the cost per yard was \$2.05 including the laying of about 3,000 ft. of 60-lb. rail. Adding to this a blasting charge of \$0.26 per cu. yd., the total excavating charges were \$2.31 per cu. yd. to blast, load, fill and lay permanent 60-lb. rail.

It has been estimated that the shoveling machine will load rock about five times as fast as it can be loaded by hand. Less sledging is necessary, in fact the shovel will handle any piece

that will go through the end gates of these mine cars; this is well illustrated in Figure 2. The coal company intends to continue the use of this machine for loading the brushed rock on entries in No. 1 Mine after the grading operation is completed in the Main Dip Section as the shovel has proven its superiority over hand loading especially when the rock thickness is 2 ft. or more.

NO. 2 MINE

The No. 2 Mine of this company is located in Fayette County, Pennsylvania. This mine, also a shaft operation, is operating in the Pittsburgh Seam of coal which averages 8 ft. in thickness overlain with about 12 in. or more of draw slate and above the latter is 18 in. of roof coal or "rashings." There is in operation at this mine, a permissible type of Myers-Whaley No. 4 shovel, the specifications of which are as follows:

- Weight—About 18,500 lbs. in working order.
- Track gauge—44 in.
- Length—26 ft.
- Width over all—5 ft., 4½ in.
- Height—4 ft. 9 in.
- Wheel base—42 in.
- Reach—10 ft. to each side of center of track.
- Width of shovel—34 in.
- Power Consumption—12 H. P.
- Motor—20 H. P. for 250 or 500 volts d. c.
- Capacity—45 cu. ft. per minute in loose material.

This machine is illustrated in Figure 1 which shows the operator's side of it. To the rear of the operator's seat will be noticed the explosion proof permissible motor casing with the U. S. Bureau of Mines approval plate.

The shoveling machine at No. 1 Mine is confined to grading work in virgin territory but at No. 2 Mine it is used in cleaning up falls of roof and sides in old entries, air courses and rooms. No. 2 Mine is completely developed and on full retreat. There are sections of it that have been opened and standing for a number of years. The roof is characteristic of the Pittsburgh Seam in the

"Coke Region" of Pennsylvania and weathers to a considerable degree when left exposed to the mine atmosphere. Falls occur due to this and also the decay of mine timber of long standing. It is not uncommon to find falls of from 18 in. to 2 ft. of draw slate and as much more of the "rashings" giving a total of 3 to 4 ft. of roof material. It is necessary that these falls be cleaned up so that the standing pillars may be recovered and also that the ventilating current be adequately coursed throughout the mine. As this mine is gaseous and as the machine is frequently cleaning falls in return air currents, it was imperative that it be of the permissible type. The current is carried to the machine through heavily insulated or armored cable attached to the supply at flame proof junction boxes placed conveniently. The labor crew with the machine usually consists of four men who not only assist in loading rock and move the cars but also timber the places cleaned up. This crew does not lay the permanent track but is followed by another crew on a different shift. The machine crew, however, does lay small sections of rail 6 to 8 ft. long to take care of the advance of the machine. The principal delay in the loading operation is in the shifting of mine cars, which must be placed one at a time, but an effort is made to keep a parting or side track within 250 ft. of the working place of the machine.

WANTS LAW TO END COAL STRIKES

The strike of the bituminous coal miners, now in its eighth month, in Ohio and parts of Pennsylvania, will be urged by Representative Loring M. Black, of New York, as justification for the enactment at the coming session of Congress of legislation providing some method of dealing with industrial disputes in the coal industry.

A bill modeled after the provisions of the railway labor act, according to Representative Loring, will be introduced at the opening of the session and its adoption insistently advocated. This is in line with recommendations made by President Coolidge in messages to the Sixty-eighth and Sixty-ninth Congresses. He pointed out that the Federal Government is helpless in the face of suspensions of coal mining and told Congress that this situation should be corrected.

The railway act, Representative Black asserts, has averted what promised to be serious clashes in the railroad industry and he declared that although there have been several hundred issues over wages and working conditions, not a day has been lost through strikes.



METALS

PRACTICAL OPERATING MEN'S DEPARTMENT

GUY N. BJORGE, Editor

*Practical Operating Problems of the
Metal Mining Industry*



REVERBERATORY PRACTICE AT MAGMA SMELTER*

Removal Of End Burners Lengthens Life Of Arch But Does Not Improve Fuel Ratio—Siliceous Ore Fluxed With Concentrate And Lime Used For Deficiency—Continuous Skimming Impracticable — Lost Time For Repairs, 2½ Percent Of Total Annual Operating Time

THE reverberatory is 22 ft. by 96 ft., inside dimensions, and is built entirely of silica brick with the exception of a small section of magnesite brick at the tap holes. The bottom is crushed quartzite, burned in the usual manner. The side walls are 27 in. thick from the concrete foundation to the slag line and 18 in. thick above this point. The arch was originally all built of 20-in. brick, but when replacements have been made to the first section of the arch 20-in. brick was used for the outer third at each side, while the middle third, constituting the crown of the arch, was built of 15-in. brick. This arch burns more evenly and lasts longer than the all 20-in. arch. The furnace has a short uptake flue running across the furnace over the uptake with a waste heat boiler at either end. Tap-holes are located at points about 30, 37 and 75 ft. from the bridge wall. At present only the 75-ft. tap-holes are being used.

The furnace has two 700-h. p. waste heat boilers arranged with dampers so that either, or both, may be used. Under ordinary conditions only one boiler is used.

The supporting steel consists of buckstays built up from two 12-in. I-beams and are spaced 3 ft. 6 in. apart. The cross tie-rods are 2 in. in diameter. There are four end buckstays at each end of the furnace, each built up of two 18-in. I-beams. The longitudinal tie-rods are 2½ in. in diameter.

Two charge hoppers, running the entire length of the furnace, are provided, one at each side with a short cross

By J. H. ROSE †

hopper near the bridge wall. The charge pipes are spaced 3 ft. 6 in. apart. They have dust-tight gates at the upper ends, while the lower ends are connected to the cast iron charge hole castings which rest on the arch. The gates are operated from an elevated platform running along each side of the furnace. Converter slag is returned to the furnace through a cast iron launder extending through the bridge wall immediately under the center of the arch.

The furnace was originally provided with six oil burners arranged in a single row. The burners use air at 2 lbs. pressure and oil at 80 lbs. pressure, heated to 200 degrees F. The air is supplied by centrifugal blowers which have a capacity of 3,000 cu. ft. per minute. Recently only four burners have been used. The two end burners were removed and the holes bricked up. This change was made primarily to keep the flame farther from the arch. It promises to lengthen the life of the arch, but has not improved the fuel ratio.

The charge consists of hot calcine with some ore used as fettling. The roaster charge consists of a mixture of concentrate, crude ore, converter by-products, and lime rock, the latter materials crushed to ¾ in. The proportion of concentrate in the bedded mixture is quite variable, at times as low as 40 percent and again as high as 75 percent. This variation is caused in part locally by variations in the proportions of crude ore and milling ore from the Magma Mine, and in part by a variable supply of custom ore. The ore is all bedded as received and no ore is held in storage with the idea of making a uniform

charge. The bulk of the custom ore received is quite siliceous and this is fluxed as far as possible with concentrate. Lime rock is used to meet any deficiency, and of necessity the proportion of lime rock varies greatly with varying proportions of siliceous ore in the mixture.

Calcine is hauled in closed-top cars, having a capacity of about 6 tons each, while other material is hauled in open-top cars. The haulage is done by storage battery locomotives. Hot calcine constitutes most of the charge, although some cold fettling is used. The charging zone extends for about 60 ft. from the bridge wall, although most of the smelting is done in the first 30 ft. Charging is done at regular and frequent intervals so as to keep the unsmelted charge in the furnace and the combustion space as nearly as possible at a constant volume. The average daily tonnage of solid charge is about 315 tons, although it frequently falls as low as 275 tons during periods when ore and concentrate receipts are low.

The daily oil consumption averages 200 bbls. per day, giving an oil ratio of .64 bbls. per ton solid charge. The air supply to the burners is adjusted to give a short flame when operating under a draft of .03 in. at the uptake.

The furnace is skimmed at intervals of about 2 hours, the slag being tapped through a small hole in the clay breast. Continuous skimming is not considered practicable on account of the comparatively small tonnage of slag produced. The slag is hauled to the dump in standard gauge slag cars, hauled by an electric locomotive.

The furnace is tapped through tap holes located (Continued on page 916)

† Smelter Superintendent, Magma Copper Co., Superior, Ariz.



Tank House Interior, Leaching Plant, Inspiration Consolidated Copper Company

THE INSPIRATION LEACHING PLANT*

This Plant Unique In Its Carriage Of High Ferric Sulfate Content—Motor Pulleys Lagged To Prevent Slippage—Cast and Forged Steel Shells Of Equal Efficiency—Method Of Ore Bedding In Leaching Tanks Vital—Product Electrolytically Pure

THE object of this paper is to give some of the problems encountered and the remedies used during the first few months of operation of the Inspiration Leaching Plant.

The metallurgy of the Inspiration Leaching Plant is a departure from that used at any of the other large leaching plants, in that a deliberate effort is made to carry enough ferric sulfate in a sulfuric acid solution to dissolve the copper contained as chalcocite in the ore. This high percentage of ferric sulfate entails certain difficulties in electrolytic precipitation, reducing efficiency and necessitating higher current densities than have been used heretofore in commercial leaching and precipitation.

The construction of the plant was practically completed on October 1, 1926, and the first tank of ore was charged on October 3.

FINE CRUSHING PLANT

The fine crushing plant consists of four sets of 78-in. x 24-in. Traylor rolls, one being a spare.

The ore as received by the roll plant has been crushed from mine run by means of No. 8 gyratories and horizontal shaft Symons crushers set at 1½ in. The roll plant is in closed circuit with a screening plant of Hummer electric screens. The final product of the screen-

By H. W. ALDRICH †

ing plant to the leaching tanks is the undersize of ¾ in. ton-cap screens. One set of rolls takes the oversizes from ¾-in. screens and two sets receive the oversize of the ¾-in. screens.

The crushing and screening plants have given no serious trouble. The capacity is ample. Three sets of rolls will crush 8,600 tons of ore through the ¾-in. screens in 11 hours. This plant is down during the day shift, crushing on afternoon and night shifts only.

The rolls were equipped with Lenix drives and leather belts. The motor pulleys were steel, and considerable trouble was experienced with the leather belts due to slippage on the motor pulley. Rubber belts were then tried and were not much better. The motor pulleys were then lagged and no further trouble from this source has occurred. Two hundred and twenty-five horsepower motors are used on each roll and no trouble has been experienced in starting with the motors. The crane is never used to turn the rolls over.

It is a little early to give figures on steel consumption, but so far it appears that about 0.08 lbs. of steel per ton of ore is the correct figure. Both cast and forged steel shells are being tried and as yet neither has shown to advantage over the other.

LEACHING

The crushed ore from the screening plant passes over a weightometer and then through a sampling plant. In this way the tons of ore and the assay for each charge are determined.

There are 13 concrete lead-lined leaching tanks equipped with lead piping and lead pumps for circulation and transfer of solutions. Each tank has a capacity of 8,600 dry tons of ore, thus determining the capacity of the plant, as one tank is charged and one discharged each day. The tanks have filter bottoms made up of 2-in. plank with ¾-in. holes. The percolation of solution is in an upward direction, and all tanks are in series as regards solution flow. The strong solution entering the leaching system is introduced at the bottom of the tank containing the oldest ore, or that which has been under acid contact the longest time. The overflow from this tank passes to the bottom of the one containing the next oldest ore, and so on through the series. The solution overflowing from the newest ore, as it is strongest in copper and weakest in the solvents, goes to the electrolytic tank house for precipitation of a portion of its copper. The outflow from the tank house, where the solvents have been regenerated, returns to the oldest ore in the leaching system, thus completing the circuit.

† Superintendent of Leaching Plant, Inspiration Consolidated Copper Company, Inspiration, Ariz.

There are eight charges under acid contact at all times, three under washing schedule, one charging and one discharging.

There are five advancing wash waters grading down in copper content from No. 1 to No. 5. At the end of eight days acid contact, the strong acid solution is drained from the oldest ore and the charge covered with No. 1 wash. After a two hour circulation, this wash is drained to the solution system and enters the tank house. The No. 2 wash is then applied and after circulation drains to the No. 1 wash water tank and is used for the No. 1 wash on the next charge. Each wash up to No. 5 is applied in the same way and drained to the solution tank number next above it in the series.

At the end of the washing with the five advancing wash waters, the No. 5 wash water tank is empty. The partially washed charge is then put in closed circuit with the iron precipitation launders. In this way, the equivalent of several copper free solution washes are given the ore, the copper free overflow from the iron precipitation launders going through the ore charge and then back over the iron. A volume of this high iron solution equivalent to the volume of wash water advance is then drained to the No. 5 solution tank for use on the next charge. A volume of fresh water follows the last iron solution wash on the ore to wash out the iron. The cement



The Inspiration Leaching Plant

copper precipitated in this operation is either redissolved with strong ferric sulfate solution from the tank house outflow, and reprecipitated as electrolytic

copper, or shipped direct to the smelter.

The scrap iron used consists of baled detinned cans purchased from Los Angeles.

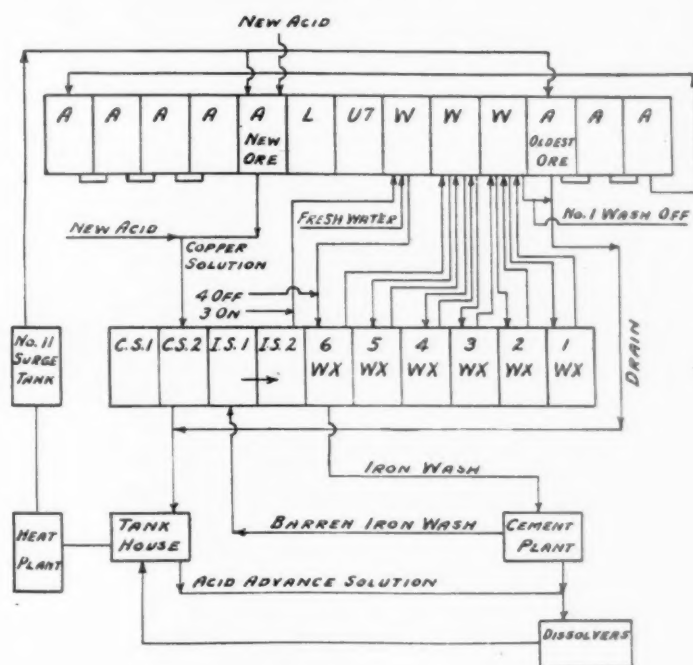
The above operation, in addition to giving an almost perfect wash of the leached ore, serves to furnish enough iron to keep the main solution strength at about 2.0 percent. A total iron content of 2.0 percent in the main solution system is required in order that the tank house outflow be maintained at 1.0 to 1.2 percent ferric iron. This strength of ferric sulfate is the economical point for copper sulfide extraction and tank house efficiency.

The loss in solution volume which necessitates the advance of wash waters is caused by evaporation and loss through moisture going out in the tailing.

The only feasible method of oxidizing ferrous sulfate to ferric sulfate was by the electrolytic precipitation of copper. For every pound of copper precipitated electrolytically, a certain amount of ferrous sulfate is changed to ferric sulfate. The amount depends upon the anodic efficiency.

The total main solution volume was made up to 2.0 percent iron as ferrous sulfate before any leaching was done. This was accomplished by dissolving scrap iron in dilute sulfuric acid solutions. The sulfuric acid strength of the solutions was brought up to 5.0 percent by adding concentrated acid. The acid was the solvent for the oxidized copper contained in the ore as silicate, but ferrous sulfate will not dissolve the copper from the copper sulfide. This fact precluded the possibility of obtaining any sulfide extraction until a certain amount of oxidized copper had been dissolved and precipitated electrolytically. Therefore every effort was made to mine ore carrying as low a percentage of sulfide copper as possible. This was quite successful and the average percent sulfide copper in the feed for October was 0.16. The oxidized copper was dissolved and precipitated, bringing up the ferric sulfate, so that by the end of November it was sufficiently high to give a reasonable

LEACHING OPERATION INSPIRATION CONS. COPPER CO.



- A = ORE UNDER ACID TREATMENT
- L = LOADING
- UT = UNLOADING
- W = ORE WASHING
- WX = WASH WATER SOLUTION TANKS
- IS = IRON SOLUTION STORAGE TANKS
- CS = COPPER SOLUTION TANKS

sulfide recovery. It gradually increased until in January the average was over 1.0 percent iron as ferric sulfate. The estimated requirement was 1.0 percent or over.

The first nine charges of ore gave very good oxide copper extractions. It was necessary for the mine and crushing plant to work up to full capacity gradually, so some of these first charges were given as high as 20 days acid contact and seven or eight days wash.

Commencing with the tenth charge, results commenced to fall off. For nearly a month oxide recoveries were very poor. Everything that could be thought of was tried to remedy this. It was then decided to go back to pilot plant practice in all details, whether they seemed important or not. It finally developed that the solution of the difficulty lay in the method of bedding the ore in the leaching tanks.

The ore spreading mechanism was designed to charge the tanks as had been done at Ajo and Chuquicamata for years. This system was as follows: The spreading bridge was spotted over one edge of the tank and the automatic tripper on the bridge traveled back and forth until the ore at this point was at the level of the top of the tank and took its angle of repose to the bottom. The bridge was then moved to the opposite edge of the tank and this operation repeated. It was then moved a few inches at a time from one edge toward the other until the tank was full. In this way there was a definite classification of material, the coarse particles rolling to the bottom of the tank and the fine remaining on top. This scheme was deemed to have advantages in an upward percolation process. On certain types of ore where there is a small amount of very fine material or of colloidal material, this seems to be successful, but it was not applicable to Inspiration ore.

The secret of good leaching extraction in a percolation system is, of course, a free percolation, where equal amounts of solution travel through every square foot of tank area. Where there is a segregation of fine or colloidal material this is not possible, and it was decided that the trouble was caused by segregation of fines. Certain portions of the charge received very much in excess of their requirement of acid solution and other portions received practically none. This theory was borne out by the appearance of the charge when excavating. Large brown areas were seen, and upon being sampled and assayed, were found to be practically unleached.

A different system of bedding was adopted whereby the bridge was moved at short intervals back and forth across the tank and the charge brought up evenly over the whole area until the tank was full. Gratings of wood were put in to break the fall of the ore as much as possible to prevent packing. The improvement in results was immediate, the oxide copper in the tailing of the first charge bedded in this way being half what it had been with the other method of charging. The only satisfactory explanation of the good results obtained on the first nine charges seems to be the excessive length of acid contact and washing time allowed for them.

Vertical lead pumps of the screw type are used for forcing the solution up through the ore bed. These have been very satisfactory.

For the first three or four months a great deal of difficulty was experienced through leaks in the lead lining of the leaching tanks. Most of the leaks were due to split seams caused either by defective lead burning or by the movement of the lead as it was forced in against the concrete walls and into the corners of the tanks. This trouble has now been practically eliminated.

The filter bottoms of the leaching tanks, as stated before, are made of 2-in. plank with $\frac{5}{8}$ -in. holes bored in

them. These are weakened after a time by the action of the acid. The Inspiration excavating bucket is not of the stiff leg type used at Ajo. It is necessary in order to clean the tank to a reasonable extent to drag the lips of the bucket over the filter bottom. Much trouble has been experienced through the bucket tearing up the filter. This difficulty has been remedied by placing 4-in. by 4-in. timbers spaced 2 ft. 6 in. apart running the length of the tank and parallel to the closing di- (Continued on page 916)

TABLE I

	Estimate Per Ton	Jan. Actual Per Ton	Feb. Actual Per Ton	Mar. Actual Per Ton	April Actual Per Ton	May Actual Per Ton	June Actual Per Ton	July Actual Per Ton
Crushing								
Crushing to Bedding	\$0.109	\$0.112	\$0.113	\$0.108	\$0.105	\$0.111	\$0.102	\$0.106
Leaching								
Acid Expense	\$0.126	\$0.188	\$0.155	\$0.129	\$0.134	\$0.149	\$0.159	\$0.141
Heating Solutions	.040	.084	.038	.035	.028	.018	.008	.001
Tailing Disposal	.076	.056	.061	.066	.049	.064	.059	.071
All Other	.059	.047	.056	.039	.038	.037	.048	.043
Total Leaching	\$0.301	\$0.325	\$0.310	\$0.259	\$0.249	\$0.258	\$0.274	\$0.256
Precipitation								
Power	\$0.013	\$0.0128	\$0.0126	\$0.0158	\$0.0132	\$0.0123	\$0.0123	\$0.01161
All Other	.0080	.0091	.0088	.0098	.00986	.00912	.00926	.00728
Total Precipitation	\$0.0210	\$0.0219	\$0.0214	\$0.0256	\$0.02308	\$0.02125	\$0.02159	\$0.01889

TABLE II

MONTHLY METALLURGICAL REPORT—JUNE-JULY, 1927

	July	June
Heads—Charge Nos. 225-252:		
Ore charged—tons wet	251,592	264,368
Percent Moisture	4.108	3.930
Ore charged—tons dry	241,259	253,978
Percent oxide copper	.785	.754
Percent sulfide copper	.347	.441
Percent total copper	1.132	1.195
Percent ore on 4 mesh	42.49	42.7
Percent ore through 20 mesh	21.50	21.0
Tailings—Charge Nos. 225-252:		
Percent Moisture	11.379	11.133
Percent oxide copper—acid soluble	.044	.042
Percent oxide copper—water soluble	.007	.005
Percent sulfide copper	.108	.155
Percent total copper	.159	.202
Percent oxide copper extraction	98.503	93.77
Percent sulfide copper extraction	68.876	64.85
Percent total copper extraction	85.954	83.10
Lbs. copper dissolved per ton of ore	19.46	19.86
Solutions:		
Gals. per minute acid solution advance	1,504.0	1,732.2
Total gallons acid solution advance	67,140,000	75,032,000
Gals. per minute cu. sol. to tank house	1,745.4	1,866.7
Total gals. cu. sol. to tank house	77,916,000	80,146,000
Sp. Gr. of solution to tank house	1.206	1.204
G/L cu. in solution from tank house	29.5	29.8
G/L cu. solution from tank house	24.5	24.4
G/L acid in solution to tank house	42.8	42.6
G/L acid in solution from tank house	56.7	57.7
G/L total iron in solution to tank house	18.2	19.6
G/L ferric iron in sol. to tank house	7.8	7.7
G/L ferric iron in sol. from tank house	11.1	11.8
Total gals. acid solution to dissolvers	7,892,700	7,759,900
G/L cu. in solution to dissolvers	22.49	21.97
G/L cu. in solution from dissolvers	27.09	28.44
Solution temp. to tank house °C.	37.2	35.7
Solution temp. from tank house °C.	46.7	46.1
Solution temp. from heating plant °C.	29.8	46.6
Atmospheric temperature °C.	29.8	24.2
Gallons of oil burned	8,708	
Tank House—Commercial Division:		
Total weight of commercial cu. produced	4,567,122	4,212,343
Total weight of cathodes produced	5,187,546	4,795,548
Average weight of cathodes produced	99.4	99.5
Average voltage between anodes and cathodes	2.34	2.38
Average current density	15.0	15.9
Number of tanks on cathodes	120	119.4
Tank House—Starting Sheet Division:		
Number of tanks on starting sheets	14	14.6
Number of starting sheets made	63,929	64,366
Average weight of starting sheets	10.7	10.8
Total weight of soluble anodes received	887,040	814,160
Total weight of anode scrap shipped	312,160	128,018
General:		
Lbs. electrolytic cu. shipped, Lots 243-287	5,274,667	4,925,904
Gross A. C.-K. W. H. to sub-station	7,254,000	7,564,000
Gross D. C.-K. W. H. to tank house	6,730,265	7,015,333
Percent conversion efficiency	92.78	92.75
K. W. H.-A. C. per pound of copper	1.637	1.679
Av. percent ampere efficiency on produced cu.	60.42	60.69
Lbs. of 60° Be. acid per ton of ore	27.78	32.71
Gals. of new water used for washing	6,806,000	6,895,000
Lbs. cu. as cement cu. to smelter	330,142	802,382
Lbs. cu. slimes to refinery	13,735	8,014



General Plan of Leaching Plant

RETREATMENT OF CONCENTRATES AT MIAMI COPPER COMPANY*

Present Ores Contain An Excess Of Pyrite—Selective Flotation And Concentration Essential To Reduce Smelting Costs—Net Gain of One-Third Of A Million Dollars Per Annum Results

By H. D. HUNT†

THE ore bodies of the Miami Copper Company are secondarily enriched ores in which pyrite has been the precipitant of the descending copper bearing solutions. The mineralization of the resulting orebodies consists principally of chalcocite and pyrite accompanied by a limited percentage of the usual oxidized copper minerals principally copper silicate. In the higher grade orebody which now is practically worked out, the original pyrite was almost completely replaced by chalcocite so that the ratio of chalcocite to pyrite was high and direct concentration of this ore by gravity concentration in the earlier operations and all-flotation concentration in recent years produced an average concentrate containing 41.17 percent copper and an average ratio of concentration of 27 into 1.

The low grade orebody now being worked by the Company contains an excess of pyrite, as compared with the high grade ore previously worked and since the pyrite was the precipitant of the chalcocite, the major portion of the chalcocite in the low grade ore occurs as a film upon or a partial replacement of the pyrite. Consequently, direct concentration of this ore under conditions identical with those in the previous all-flotation concentration of the high grade ore, particularly as regards grinding of the ore, gave a concentrate containing 20.34 percent Cu, 28.3 percent Fe, 13.4 percent Ins., and a ratio of concentration of 24 into 1.

Under the Company's smelting contract, freight and smelting charges on concentrate of this grade were excessive and the production of a considerably higher grade concentrate from the low grade ore was an economic necessity, which presented the problem of selectively floating the chalcocite from the pyrite in the ore.

The selective flotation of the chalcocite from the pyrite raised several interesting problems. Experiments had shown that a very satisfactory sulfide copper tailing could be obtained when grinding the ore to 2 percent +48 mesh, 9 percent (Cum.) +65 mesh, 24 percent (Cum.) +100 mesh and 55 percent —200 mesh, a comparatively coarse grind in which 93 percent of the copper in the ore was in the —100 mesh material and 74 percent of the copper in the ore would pass 200 mesh, from the concentration of which the 20 percent copper concentrate was produced; whereas, the interlocking of the pyrite and chalcocite was such that in order to produce a concentrate containing 30 percent copper, directly from the original ore, it would be necessary to grind the ore all through 65 mesh and to 5 percent +100 mesh and 70 percent —200 mesh, a comparatively fine grind for such a low grade ore, in which 95 percent of the copper in the ore would pass 200 mesh. This fine grinding of the ore was not particularly attractive since, with the milling equipment available, it was estimated that on the Miami ore which is hard to fine grind because of the secondary silici-

fication of the schist, the mill capacity would be about 20 percent less when grinding to 5 percent on 100 mesh and because of the decreased capacity with fine grinding, the mining, milling, and general expense of the plant would be practically correspondingly increased since aside from the production of the higher grade concentrate there was practically no metallurgical advantage gained by fine grinding of the ore; i.e., the tailings loss was practically the same in both cases.

Because of the relatively high ratio of concentration obtained with the coarser grinding and the production of the 20 percent Cu concentrate (ratio 24:1) which on a tonnage of 10,000 tons of ore per day gave but 417 tons of 20 percent concentrate per day, the possibility of confining the selective flotation operation to the treatment of the 20 percent concentrate was particularly attractive since this scheme retained the advantages of the high daily tonnage and the comparatively coarse grinding of the ore. The metallurgical problem thus presented was decidedly interesting, involving grinding the concentrate all through 200 mesh; selectively floating chalcocite from pyrite in a concentrate which had been "bulk floated" in a previous operation and the effect of the circulation of the reject from the selective flotation operation back to the primary ore concentration operation was indeterminate.

Laboratory work followed by plant work on a scale of 100 tons of ore per day demonstrated that the "Concentrate Retreatment" operation was entirely feasible, this preliminary work indicating that a .05 percent sulfide copper tail-

ing and a 32 percent Cu concentrate could be produced with a ratio of concentration of 37:1, or 268 tons of concentrate per day produced from 10,000 tons of ore by the retreatment scheme. This preliminary work indicated that the essential steps in the operation were:

1. Complete segregation of the primary and the concentrate retreatment operations except for the circulation of the retreatment reject to the primary rougher cells.

2. Fine grinding the primary cleaner concentrate before the retreatment operation.

3. Careful control and regulation of pulp alkalinities and reagent quantities.

It was therefore decided to install necessary equipment to retreat the concentrate produced from 10,000 tons of ore per day.

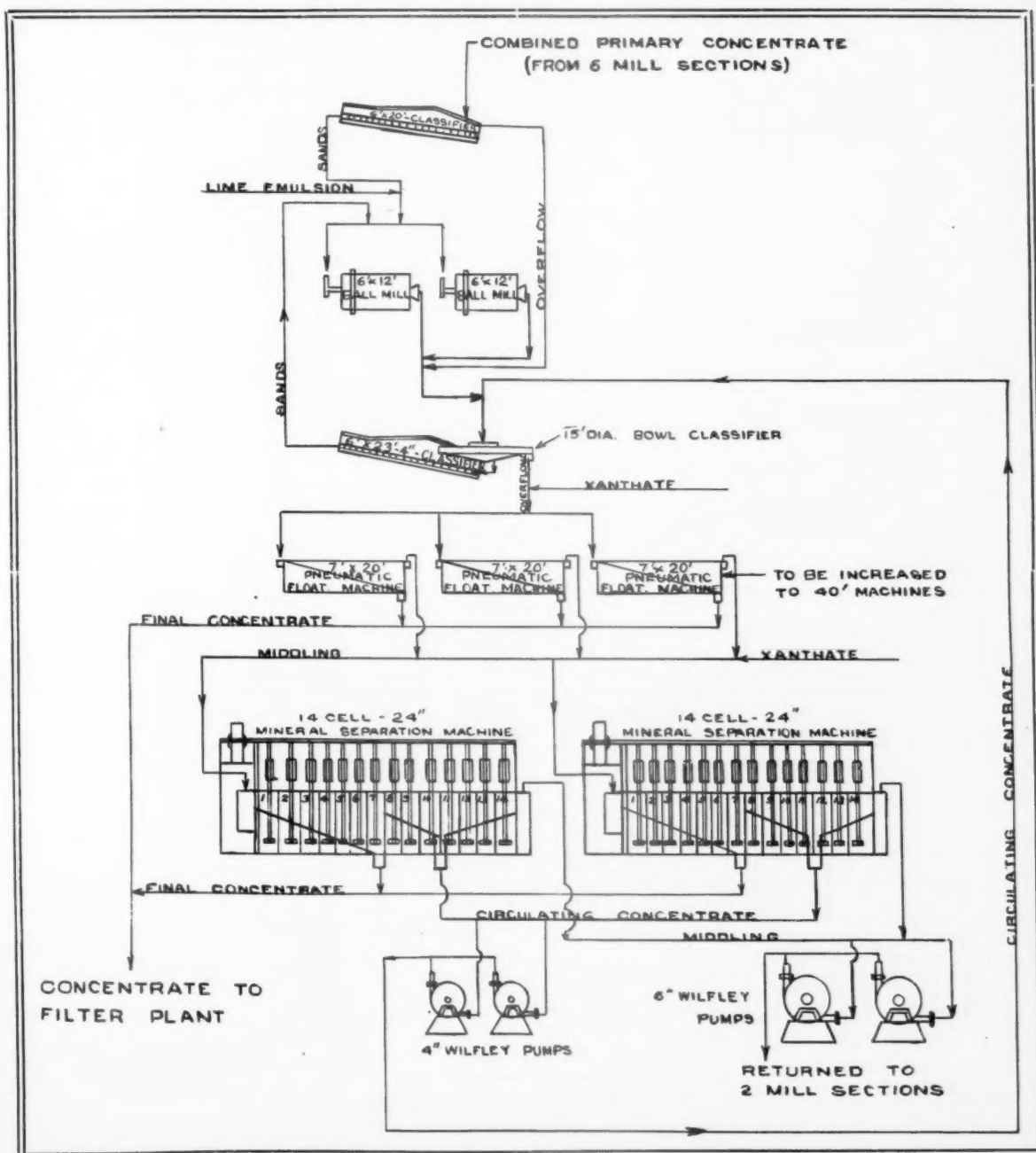
The more or less expected difficulties met in translating an operation from a scale of 100 tons per day to one of 10,000 tons per day were encountered and have to a large extent been overcome. Our difficulties were not only in the process but also in equipment. It was soon discovered that grinding, classification and flotation operations on a concentrate containing 85 to 90 percent mineral were vastly different from those same operations on a low grade ore.

In the full scale operations, the principal problem has been not so much the production of a high grade concentrate but that of the circulation back to the two primary mill sections of a high grade reject from the retreatment plant and the effect of this reject upon the tailings and concentrates of these two primary sections. To date with the flotation equipment available, a concentrate of almost any desired grade can be produced by increasing the pulp alkalinity but this results in a correspondingly



General View of the Retreatment Plant, Miami Copper Company

* Miami Copper Company, Miami, Ariz.



Flow Sheet, Concentrate Retreatment Plant, Miami Copper Company

high circulating reject, which in turn results in an increased tailings loss and a greatly increased tonnage of concentrate on the two primary mill sections handling this circulating reject. In these two primary mill sections, which handle their full quota of original ore, there is the analogous condition of having to float practically all of the pyrite from the original ore because of its entanglement with chalcocite; having to refloat the chalcocite from the circulating reject which has been depressed in the retreatment operations; and having to keep depressed the pyrite from the circulating reject so that this pyrite will be eliminated with the ore tailings. The balance between these operations is delicate

* Effect of cyanogen compounds on the flotability of pure sulfide compounds.

but as in the experimental work, this balance is maintained by careful control of pulp alkalinities and reagent quantities.

Tucker and Gates* in their very interesting paper on the relative flotability of the various copper sulfide minerals and pyrite, clearly showed the sensitiveness of chalcocite to high lime alkalinities which our laboratory and plant work had also shown.

The cost of the concentrate retreatment operations for the past six months has averaged \$.01413 per ton of ore. Economically, the concentrate retreatment operations have been very successful. Metallurgically, there still is something to be worked and hoped for, particularly as regards the elimination of the additional tailings losses on the two primary mill sections which treat the

retreatment plant circulating reject, and the production of even a higher grade concentrate, because even on the present grade of concentrate, smelting, freight and refining charges are high.

Following is a flow sheet of the retreatment plant at present, together with results which are typical of our operations for the months of July, August, and September, 1927.

On a basis of 12½ cent copper market, and treating 11,300 tons per day, the retreatment of concentrates results in a saving in freight and smelting charges of \$.02184 per ton of ore, at a cost for retreatment and loss of copper of \$.04169 per ton, or a net gain of \$.08015 per ton, which amounts to approximately \$325,000.00 per annum.

(Continued on page 916)

REVERBERATORY PRACTICE AT MAGMA SMELTER

(Continued from page 909)

about 75 ft. from the bridge wall. This involves a long matte launder and considerable labor in keeping it in shape, but does give a furnace operation with much greater freedom from fouled tap holes and high matte level at the skimming bay.

The operating crew is made up of seven men per shift, consisting of one foreman, one motorman, two helpers, and three laborers. The motorman and one laborer haul the charge to the furnace while the two helpers and two laborers drop the charges, do the skimming and tapping, haul the slag to the dump and take care of the matte launder.

The average evaporation in the waste heat boilers is 6.4 lbs. steam per lb. oil burned when reduced to equivalent evaporation from and at 212 degrees F.

	Cu.	Ag.	Au.	Fe.	SiO ₂	Al ₂ O ₃	CaO	S
Calcline	13.77	7.61	.076	23.4	25.6	4.4	4.0	13.0
Reverb Slag .....	.40	0.24	.002	30.3	40.8	6.4	6.6	...
Matte	39.00	21.80	.24	28.5	...	...	...	23.7

THE INSPIRATION LEACHING PLANT

(Continued from page 912)

rection of the bucket. This leaves a layer of tailing 4 in. deep in the tank at all times, but the bucket lips ride on the 4-in. by 4-in. pieces and distribute the weight of the bucket over a greater area of filter bottom, which prevents the breaking of the filter boards.

With the exception of leaks in the lead lining of the leaching tanks, all of the lead equipment such as valves and pumps have given very little trouble.

PRECIPITATION

The commercial division of the electrolytic precipitation plant is composed of 120 tanks each containing 85 lead anodes and 84 cathodes, making in all 10,200 anodes and 10,080 cathodes.

The tanks are divided into eight sections of 15 each as regards solution flow. The solution passes from the leaching system to the first section at the rate of 100 G. P. M. to each tank. The sections are in series, that is, all solution passes through each section before returning to the leaching system.

The direct current power is furnished by three motor generator sets each consisting of one motor and two 6,000-ampere generators. The capacity of the three sets is 36,000 amperes at 320 volts.

The electrical circuit in the tank house is in parallel, the total ampere delivery of the machines passing through each tank.

Very little mechanical trouble has been experienced in the tank house. The ampere efficiency is somewhat lower than that estimated, but the pounds of copper yield per K. W. H. is within the estimate. The lead anodes warp badly and cause excessive sprouting, thus reducing efficiency. This will be remedied in a short time by the installation of an anode press which will straighten the lead sheets 14 at a time. This will easily allow for straightening all anodes once

The average analyses of calcine, reverb. slag, and matte for the year 1926 is given below:

The length of furnace runs between stops for arch replacements averages about 12 months with one intermediate stop of 16 hours to rebuild the bridge wall. The annual repair involves rebuilding the bridge wall, a 20-ft. section of the arch, some side wall repairs, and a replacement of the walls in the furnace throat and the side walls and arch of the uptake flue. This work requires about five days, with a total lost time of eight days of furnace operation. The intermediate bridge wall repair requires about 16 hours, making the total annual lost time for repairs, nine days, or about 2½ percent of the total time.

a week, where with present equipment it requires 30 days.

The life of a cathode is six days, and 20 tanks are pulled per day. The starting sheet weighs 10 pounds and is built up at the end of six days to a little over 100 pounds. The cathodes are weighed and loaded directly into cars at the tank house. The copper produced is electrolytic copper as regards purity, but is melted, poled and cast into commercial shapes at the Raritan Refinery at Perth Amboy, N. J.

The capacity of the electrolytic plant was estimated at 150,000 pounds per day and it will produce this under present anode conditions. Upon the completion of the anode press, this capacity should increase to 160,000 pounds per day.

Starting sheets are made as in regular refinery practice. Converter copper at the smelter is cast into 900-pound anodes and shipped to the tank house. The starting sheet solution circuit is entirely separate from the commercial section and never goes over the ore.

Copper starting sheet blanks are used and stripped every 24 hours. At present in excess of 2,000 sheets are being made per day.

Soluble anode scrap is returned to the smelter and starting sheet scrap is baled and shipped east with the cathodes.

The tank house solution outflow is passed through a heating plant. A 500-h. p. boiler furnishes steam reduced to 2-pound pressure which is conducted through lead pipe coils immersed in solution. In the winter time it is necessary to raise the temperature of the solution returning to the leaching system about 10° C. In summer, the heat generated during precipitation is sufficient.

Table I gives estimated costs of operation as compared to those actually realized since January 1.

Table II gives average metallurgical and production figures for June and July, 1927.

RETREATMENT OF CONCENTRATES AT MIAMI

(Continued from page 915)

MIAMI COPPER COMPANY
Concentrate Retreatment

Combined section concentrate:	
15.57% Cu.	
Bowl classifier overflow—	
(Retreatment plant feed):	Screen analysis
17.55% Cu	+48 0.0
26.4% Fe	+65 0.0
19.5% Insol	+100 0.3
4.20% +200 mesh	+150 1.5
26.60% Solids	+200 2.4
1.40 Lbs. CaO per ton water.....	-200 95.8
0.04 Lbs. Xanthate per ton feed. ....	....
Pneumatic cells—	
Concentrate:	
41.06% Cu.	
6.70% Insol.	
18.7% Fe.	
Middling—(M-S feed):	
14.22% Cu.	
Minerals separation machine (.06 Lbs. Xanthate per ton feed added to M-S feed)—	
Concentrate—(No. 1-7 cells):	
36.73% Cu.	
21.1% Fe.	
6.9% Insol.	
Circulating concentrate (No. 8-14 cells):	
25.97% Cu.	
M-S machine middlings (returned to two primary mill sections):	
7.54% Cu.	
31.90% Fe.	
20.20% Insol.	
20.3% Solids.	
1.39 Lbs. lime per ton water.	
Combined final concentrate:	
39.97% Cu.	
6.70% Insol.	
19.70% Fe.	

General Mill Results

Feed:	
% Total Cu .....	.868
% Oxide Cu .....	.154
% Sulfide Cu .....	.714
% Total Fe	3.6
% Fe as FeS ₂	1.6
Average dry tons per day.....	11,300
Four mill sections on direct concentration of ore—	
General tailings:	
% Total Cu .....	.192
% Oxide Cu .....	.100
% Sulfide Cu .....	.092
Concentrate:	
% Cu	20.25
% Fe	24.7
% Insol	19.9
Two mill sections on ore and retreatment plant reject—	
General tailings:	
% Total Cu .....	.233
% Oxide Cu .....	.119
% Sulfide Cu .....	.114
Concentrate:	
% Cu	13.13
% Fe	30.0
% Insol	17.3
General mill results—	
General tailing:	
% Total Cu .....	.205
% Oxide Cu .....	.107
% Sulfide Cu .....	.098
Screen analysis:	
+48 7.9	
+65 10.1	
+100 16.1	
+150 10.8	
+200 7.9	
-200 47.2	
Retreatment concentrate:	
% Cu	39.97
% Fe	19.7
% Insol	6.7

MIAMI COPPER COMPANY
Comparative Results With and Without Concentrate Retreatment

General tailing:	Without retreatment	With retreatment
% Total Cu .....	.192	.205
% Oxide Cu .....	.100	.107
% Sulfide Cu .....	.092	.098
General concentrate:		
% Cu	20.25	39.97
% Fe	24.7	19.7
% Insol	19.9	6.7
Ratio of concentration.....	29.67 to 1	59.98 to 1
% Extraction	78.63	76.78
Net Lbs. Cu recovered per ton ore	13.24	12.93

NEWS OF THE MINING FIELD

A Resume Of The Activities Of The Mining Industry And Items Of Interest In The Field

S. G. Blaylock to Receive Douglas Medal

S. G. Blaylock, managing director of the Consolidated Mining & Smelting Co. of Canada, will be the recipient in 1928 of the James Douglas medal, awarded annually by the American Institute of Mining and Metallurgical Engineers for distinguished achievement in non-ferrous metallurgy. The selection, made by the medal committee, headed by W. H. Bassett, was recommended to the directors and approved by them.

The specific achievements in metallurgy for which the award is made are enumerated by the committee as follows: "For his development of a selective flotation process for lead-zinc-iron ores; for his part in the development of the leaching of zinc ores and the electrolytic deposition of zinc; for his improvement in lead blast-furnace practice obtaining high lead recovery from flotation concentrate, producing high zinc slags; for his success in solving the problems necessary for the treatment of the ores of the Sullivan mine; for his development and improvement of the Betts process for lead refining; for the laying out and successful operation of the Tadanac plant to carry out the very complex metallurgical operations which the handling of the Sullivan ores entails."

Quincy to Change Mining Methods

To cut costs of mining at depth, the Quincy Mining Company, in the Michigan copper district, is planning to change its system of stoping copper ground in all new openings. The retreating instead of the advancing system of mining will be used. In each case drifts will be driven to the boundary of the property and stoping then will proceed from the end of the drift back toward the shaft. This is the method used in Calumet & Hecla and some of the other mines in the district. It involves less timbering, inasmuch as the ground in stoped out areas does not require support. It also simplifies and cheapens ventilation, as air forced into the drifts is not dissipated through stopes near the shaft. In the advancing mining system of mining, which has been in vogue at Quincy, stoping is started just beyond the shaft pillar and carried along to the end of the drift. This method necessitates the use of a large amount of timber.

Work to be Resumed at Senator Mine

The Senator Mine, 15 miles south of Prescott, Ariz., which has been owned by the Phelps Dodge Corporation for 30 years, will be reopened after a shutdown of nearly 10 years. F. W. Nelson will be in charge of the work.

Old workings will be reopened and new development planned. It is hoped that the Senator will prove a source of lead ores for the Humboldt plant recently leased by the Phelps Dodge Corporation.

Magnesite Duty Increased 50 Percent

Acting upon a recent report of the Tariff Commission, the President has increased by 50 percent the duty on crude and caustic calcined magnesite to equalize the differences in cost of production in the United States and Greece and British India, which latter are the principal competing countries.

Butte Mining Case Heard Before Federal Circuit Court in San Francisco

Arguments in the case of the Moulton Mining Company, the Clark-Montana Realty Company, the Elm Orlu Mining Company, and J. Ross Clark versus the Anaconda Copper Mining Company were begun in San Francisco on November 15.

The case involves the disputed ownership of ore in the Poser and Intermediate veins alleged to apex in a claim owned by the plaintiffs. The defendant denies these claims.

The plaintiffs have appealed from a decree of the Federal District Court of Montana, dismissing their complaint.

Air Blast at Quincy Kills Seven Men

Seven men, members of a timber crew, were killed in the Quincy copper mine at Hancock, Mich., October 29, by a fall of ground following an air blast in No. 2 shaft. Two of the bodies were found the following morning under 12 ft. of rock. The work of rescuing the other bodies was prosecuted vigorously and the last one was recovered November 1.

The men were at work at the 41st level, 4,100 ft. from the surface, retimbering the shaft which was damaged by fire which broke out July 13 and burned upward for a week or 10 days. Since that time the shaft has been out of commission. The blast came with such suddenness, followed almost instantly by the

fall of rock, that the men were unable to help themselves. They were buried under tons of rock which fell into an old, burned-out loading chute which the men were engaged in blocking up, and into the shaft.

Air blasts have been intermittent in occurrence in the Quincy mine for many years but no particular fear has been attached to them because they have occurred mostly in the upper part or abandoned portions.

Domada Lead and Zinc Purchases Mine Near Cardin, Okla.

The Domada Lead and Zinc Co. has purchased the Kitty mine, located west of Cardin, Okla., Charles A. Neal, of the Domada Co., has announced. Although the exact consideration was not announced, it is said the Kitty mine brought about \$150,000.

The Kitty property, located west of Cardin, was owned by R. L. Kidner and associates. J. H. Minnick was superintendent of the mine. The Domada Co. was given a drilling option on the mine some months ago and has drilled out a large amount of ore.

The Domada Co. owns the Domada mine, south of Cardin, and the Jack and Jill, which adjoins the Kitty on the south. The Jack and Jill mill will be converted into a tailing mill within a short time, Neal announced. The mine dirt from the Jack and Jill will be trammed to the Kitty mill for treatment when the former mill is rebuilt to handle tailings. Fees of both the Kitty and Jack and Jill are under the same ownership.

Plan Mill for Howey Gold Mine

The Howey Gold Mines Company, Red Lake District of Ontario, Canada, is planning for the construction of a mill to treat the ore from the Howey mine. The size of the mill is as yet undetermined, but it is expected that it will be of 500 tons daily capacity. The size will be definitely determined when development work on the several levels is sufficiently advanced to establish more definite estimates of tonnage. It was the diamond drill operations at the Howey property that started the gold rush to the Red Lake District two years ago. The boom has since faded out, but real development is proceeding at Howey.

Tigre Mine Products to Douglas Smelter

On November 1 the Tigre Mining Company began shipping its concentrates and high-grade ore to the Phelps Dodge lead smelter at Douglas, Ariz., with a material saving in freight charges. The Tigre ores and concentrates have for 17 years been handled at the El Paso Smelter. The Tigre Company ships an average of 600 tons of concentrates monthly, containing gold, silver, copper, lead and zinc. The mines are at El Tigre, Montezuma District, Sonora, Mexico.

Ore Discovery at North Star Mine

The discovery of a promising ore body on the 7,200 level of the North Star mines, Grass Valley, Calif., has been confirmed by the management. The discovery is promising, but considerable development will have to be done to prove its importance.

The North Star Company has recently completed an intensive development campaign which included the sinking of the vertical shaft to a depth of 4,000 ft. and the sinking of two inclined shafts below the 6,300 level, the former bottom level of the mine.

Alaska Juneau Shows Profit During October

Operations of the Alaska Juneau Gold Mining Company for the month of October resulted in a profit of \$44,000 before interest and capital expenditures. This was the fourth month of the current year in which operations were profitable. In September there was a deficit of \$3,500, while August and July showed small profits.

Total receipts for October were \$216,000. Operating expenditures were \$172,000, giving an operating profit of \$44,000. Capital expenditures for the Ebner property and interest charges were \$20,500, leaving a surplus of \$23,500. This reduces the accumulated deficit for the year to \$19,900.

Mill Being Built at Hall-Interstate Mines, Idaho

Construction of a 150-ton mill and a 250-h. p. hydro-electric plant is under way at the Hall-Interstate mines, operated by the Bunker Hill & Sullivan Mining Company, near Yellow Pine, Idaho, according to Stewart Campbell, state mine inspector. The Cinnabar and Meadow Creek mines, purchased by F. W. Bradley, president of the Bunker Hill & Sullivan, have been continuously developed during the past seven years by the United Mercury Mines Company until acquired by Mr. Bradley in the early part of 1927. Since that time new buildings have been constructed at the former site of operations at both properties, and a

new set of buildings on the Meadow Creek group, 14,000 ft. from the old site.

"Should the results of this winter's development work maintain the gold values now shown by the Meadow Creek property," says Mr. Campbell, "Idaho bids fair to have a mine that will compare favorably with the great Homestake gold mine in South Dakota."

GOLD TRANSPORTED BY AIR-PLANE

A new step in the methods of transporting gold from the mines of the Mother Lode in California was taken recently when a gold brick valued at \$2,500 was transported by airplane from the Demarest Mine at Fourth Crossing, Calaveras County, to San Francisco. This marks the great change from the early days of the Wells Fargo Express.

California Metal and Mineral Producers Elect Officers

At the annual meeting of the California Metal and Mineral Producers' Association, held in San Francisco, October 26, the following officers and directors were elected:

H. U. Maxfield, president; E. C. Hutchinson, first vice-president; Arthur B. Foote, second vice-president; George W. Starr, third vice-president. Directors: E. S. McCurdy, Edwin Higgins, P. C. Knapp, L. A. Bell, and W. P. Henry.

William E. Colby was retained as attorney.

G. Chester Brown, secretary-treasurer, and formerly chief mine inspector of the California Industrial Accident Commission, is assisting members of the association relative to accident prevention and workmen's compensation insurance in addition to his regular duties.

Mr. Maxfield, the newly elected president, is a mine operator of Sierra County, being president of the Original Sixteen-to-One Mines, Inc.

City of Six Mine Installs Equipment

The installation of new equipment at the City of Six Mine, near Downieville, Calif., has been completed. Preparations are being made to drive a crosscut tunnel to cut the vein 375 feet below the old workings.

The property includes a length of 6,000 feet along the Gold Hill vein system.

Operations to Start at Nevada Fluorspar Property

According to announcement made by the Fluorite Producers, Inc., the mining of fluorspar on a big scale will shortly begin on the large deposits of this material near Mt. Montgomery, Nev. The property is said to have an immense showing of high grade shipping ore known as "acid grade," and grades for

steel mill furnaces and glass and enameling works.

The deposit is two and a half miles from Mt. Montgomery, a small station on the Southern Pacific's narrow gauge road. A heavy duty compressor, engine and two air drills are already on the ground. During the winter months it is the plan of the company to block out large bodies of the ore.

Refractories in Zinc Metallurgy

The School of Mines and Metallurgy of the University of Missouri, Rolla, has issued a technical bulletin entitled "Properties of Refractories in Zinc Metallurgy," by E. S. Wheeler, assistant research metallurgist; A. H. Kuechler, junior ceramic engineer, Missouri School of Mines and Metallurgy; and H. M. Lawrence, metallurgist, U. S. Bureau of Mines, published in cooperation with U. S. Bureau of Mines.

The frequent renewals of retorts and condensers and the occasional repairing and rebuilding that a furnace requires in the metallurgy of zinc warrant careful consideration of the raw materials, clay and grog, that are used for the manufacture of the refractory shapes. The investigation covers raw materials and body mixtures now in use, the comparative value of various grog materials, the comparative value of various clays, and the effect of reclaimed retort materials and zinc oxide upon the physical properties of retort mixtures. There are detailed discussions of the results obtained by the authors under each subject.

Tri-State Accident Report

An accident report recently issued by the Tri-State Zinc and Lead Ore Producers' Association shows there were 3,012 mine, mill and surface accidents in the tri-state district in the first 9 months of 1927, as compared with 4,590 in all of 1926 and 4,663 in all of 1925. The evident decline is in part probably due to the lower rate of operations in the district.

Handling of rock or ore continued to lead the mine accidents, 43.22 percent of the total mine accidents being charged to that item. Injuries caused by pieces of rock from sledging and crushing leads the list of mill accidents, accounting for 26.73 percent of the 419 mill accidents that occurred in the first three-quarters of 1927.

Shovelers suffered the most accidents in the table giving mine accidents according to occupation. Shovelers suffered 206 accidents or 38.77 percent of the total mine accidents.

Eyes continue to lead the list of accidents according to location of injury. More than 21 percent of the accidents were eye accident.

Ammonia Leaching For Zinc Ores

"Recent Developments in Ammonia Leaching for Zinc Ores," Technical Series Bulletin, Vol. 10, No. 3, by H. M. Lawrence, metallurgist, U. S. Bureau of Mines, is the title of a recently issued bulletin of the School of Mines and Metallurgy of the University of Missouri.

This bulletin of 12 pages deals briefly with the history of the development of the process, reviews present-day operations, and gives tables showing results of experiments on roasted zinc ores, zinc-lead fume, and effect of improper roasting on zinc extractions. The author's conclusions are that ammonia leaching, as a process for the extraction of zinc from complex ores or other zinc-bearing materials, has certain possibilities, which are listed.

Copies of the bulletin may be obtained by writing to the Librarian, Missouri School of Mines, Rolla, Mo.

Copper Effective in Bank Vault Construction

Perfection of a new type of bank vault that is virtually immune to burglar attack through the use of copper in construction has been announced by the Copper and Brass Research Association. According to the association, exhaustive tests just completed show that the oxy-acetylene torch, recognized by safe experts as the most powerful instrument of vault attack, requires approximately two hours to penetrate a plate of pure copper 7 in. thick.

In commenting on the significance of these tests, the association points out that a vault burglar would require about six hours of uninterrupted effort with the oxy-acetylene torch to penetrate a modern vault door 20 in. thick, containing a 12-in. plate of pure copper.

"The high resistance of copper to torch attack is explained by the fact that this metal is a rapid conductor of heat, in contrast with other metals of low-heat conductivity heretofore used in vault construction. A torch capable of developing a heat between 5,000 and 6,000 degrees Fahrenheit will penetrate the first few inches of a copper plate in a comparatively short time. However, the flame loses its efficiency as the copper conducts the heat rapidly away before the entire body of the metal can be raised to a fusing point, and the torch becomes ineffective."

As an indication of the importance which bankers, architects and vault engineers attach to this latest development in vault construction, the association points out that the vaults of the largest bank in Asia, the new \$14,000,000 Mitsui Bank Building in Tokyo, will be protected by massive doors containing copper.

COPPER COMPANIES FORM AN INSTITUTE

THE organization of the Copper Institute was effected recently by leading American producers. Its aim will be to promote closer collaboration and advance the interests of the industry.

The organization of the new body will be similar to that of the American Iron and Steel Institute, the American Petroleum Institute and others. It will cooperate with the Copper and Brass Research Association and the American Bureau of Metal Statistics. The minutes, constitution, by-laws and other relative documents have been forwarded to the United States Attorney General and to the Federal Trade Commission.

Cornelius F. Kelley, president of the Anaconda Copper Company, has been elected chairman of the Executive Committee and F. H. Brownell, first vice president of the American Smelting and Refining Company will be president. The vice presidents will be Stephen Birch, president of the Kennecott Copper Corporation, and Walter Douglas, president of the Phelps Dodge Corporation. R. R. Eckert will be secretary and treasurer.

In addition to the above officers, with the exception of Mr. Eckert, the Executive Committee will include R. I. Agassiz, president of the Calumet and Hecla Consolidated Copper Company; James H. Anderson, secretary of the United Verde Copper Company; Gordon R. Campbell, president of the Calumet and Arizona Mining Company; C. W. Nichols, president of the Nichols Copper Company; and L. Vogelstein, chairman of the Board of the American Metal Company.

COMPANIES IN THE INSTITUTE

The companies which have already joined the institute, subject to the approval of their respective boards of directors, are:

The Anaconda Copper Mining Company, the American Smelting and Refining Company, the American Metal Company, the Andes Copper Mining Company, the Calumet and Arizona Mining Company, the Kennecott Copper Corporation, the Nevada Consolidated Copper Company, the Phelps Dodge Corporation and its subsidiaries, the Braden Copper Company, the Calumet and Hecla Mining Company, the Chile Copper Company, the Cananea Consolidated Copper Company, the Greene-Cananea Copper Company, the Consolidated

Coppermines Company, the Inspiration Consolidated Copper Company, the Mother Lode Coalition Mines Company, the New Cornelia Copper Company, the Nichols Copper Company, the International Smelting Company, the North Butte Mining Company, the United Verde Copper Company, the Utah Copper Company, and the Walker Mining Company.

It is expected that other companies will join at a later date. Each member is entitled to one director in the institute, according to its constitution.

The first object of the Copper Institute will be the assembling and distribution of full information regarding the consumption and sale of copper, as well as the study of costs of producing the metal. Concerning the conditions facing the consumption and sale of copper in foreign countries, it is expected that Copper Exporters, Inc., will play an important rôle. The institute itself will conduct wide surveys in the United States covering the same points.

TO DRAW UP UNIFORM COST SYSTEM

In order to establish a uniform cost accounting system for the whole United States, member companies will be requested to turn over all their cost statements to Price, Waterhouse & Co., accountants, of 56 Pine Street, New York. The accountants will work out all the statements on a uniform basis, drawing up at the conclusion of this task a composite statement which will be given to the institute.

The composite statement will show the quantities of copper produced, in fixed periods, and at what cost per pound of refined metal. The statement drawn up by the accountants will apply strictly to composite tonnages, so that facts regarding any one company will not be made available to the others. The supplying of the necessary information by the members will be purely voluntary.

In order to report on shipments, deliveries and domestic sales the country has been divided into four districts, as follows: First, Baltimore, Md.; Bayway and Perth Amboy, N. J.; second, New England points, Hasting, N. Y.; Rome, N. Y., if canal delivery, and all New Jersey points, exclusive of the above; third, Rome, N. Y., if all rail delivery, and the Pittsburgh, Detroit, Ohio and Chicago territory; and fourth, all points west of Chicago.

TESTS INDICATE THAT RADIO WAVES PENETRATE EARTH AND ROCK

TESTS conducted by the United States Bureau of Mines in a Colorado metal mine indicate strongly that radio waves will penetrate 500 feet or more of rock strata. These preliminary experiments were observed by Dr. A. S. Eve, director of the Department of Physics, McGill University, Montreal, Canada, who is conducting a study for the Bureau of Mines of the possibilities of various methods of geophysical prospecting for the location of underground mineral deposits.

The experiments participated in by Dr. Eve were conducted with a superheterodyne set with nine electron tubes in the Caribou mine of the American Mining & Prospecting Co., at Caribou, Colo. The first test was held at a depth of 220 feet, where, by means of a loop, a strong and clear reception was obtained of a musical concert given at Denver, 50 miles distant. The evidence pointed strongly to the conclusion that this clear reception was due to the penetration by the radio waves of the solid rock strata, although there was a remote possibility that the reception was obtained through shafts and cross-cuts, toward which, however, the loop did not point. The nearest metal conductors, iron rails, were 66 feet away.

The next series of experiments was conducted at a depth of 550 feet, when "mushy" reception was obtained from Denver. This type of reception was, however, as good as could be obtained

above ground at the time of making the test, the night being unfavorable for general radio reception. This series of tests was conducted at the end of a cross-cut reached with many turns, and 200 feet from the main shaft. A pipe came down the shaft and followed the tunnel up to 80 feet from the point of observation.

In previous experiments conducted by the Bureau of Mines at its experimental mine near Pittsburgh, Pa., it was at first concluded that radiation and induction would penetrate rock for considerable depths. Subsequent investigations have shown that in every case the transference of radiation was by some conductors in the mine, electric wires, pipes or rails, all of which abound in modern mines.

The experiments conducted at the Caribou mine tend to confirm the view that radiation passes through rock with, of course, much attenuation. It is known that radio signals will just penetrate through a good conductor like sea-water to a maximum depth of about 50 or 60 feet, and there is no reason why radiation should not penetrate to ten times that distance through a poor conductor like dry rock.

It is felt that further investigations should include a comparison of the penetration of radio waves from a distance exceeding many wave lengths, and of radio waves generated at a distance less than a wave length.

tion of coal, lignite, shale, etc., by the Trumble process. He was also a prime mover in the acquisition of the Georgian manganese concessions by American interests.

Thane was a member of the American Institute of Mining & Metallurgical Engineers and of The American Mining Congress. In San Francisco he was a member of the Engineers Club, Bohemian Club, Pacific Union Club, Olympic and the San Mateo Polo Club; in Alaska of the Masonic Lodge and the Elks, and of the Engineers Club of New York.

He is survived by his wife, Mrs. Fay Blaine Thane, and one daughter, Fay Thane.

Manganese Inquiry

Agents of the Tariff Commission have completed field work in connection with the general investigation of the commission into the manganese production costs. The metals division of the commission is analyzing the data which was secured and is preparing a report on the subject. The report will be a statement of facts only, and no conclusions or recommendations will be advanced. The work on this case is being expedited so that it may be laid before the members of the commission at an early date, after which it will be made public.

The commission is preparing a report on fluor spar for submission to President Coolidge based on applications for changes in the duty. Producers have asked for an increased duty while consumers have countered with a request for reduced duties.

Century Zinc Drawing Plans for Mill

The Century Zinc Co. is preparing plans for a mill to be built on the Hartley lease, southwest of Baxter Springs, Kans. The Hartley lease is just south of the Sonny Boy mine of the Cortez-King Brand Mines Co.

Commerce is Drilling the Vantage No. 4

The Commerce Mining and Royalty Co. has a drilling option on the No. 4 lease of the Vantage Mining Co. The lease is located northwest of Baxter Springs. The Commerce Co. has moved a number of drill rigs onto the lease.

Drill Prospect Hole Distance of 151 Feet

What is believed to be a record distance for a horizontal prospect hole drilled with a deep-hole drill has been completed by C. Patterson and C. Sizemore at the Missouri-Kansas Zinc Co.'s property at Waco, Mo. The hole, measured with a steel tape, was 151 feet. The hole was drilled at the No. 1 shaft of the Barnsdall No. 2 mine.

Mayflower Gravel Mining Company Prepares to Resume Production

The Mayflower Gravel Mining Company is completing the rehabilitation of its 22-mile ditch and flume system in preparation for production. Plans are being made for the erection of an electric power plant.

The Mayflower Company owns 2,600 acres near Forest Hill, Placer County, Calif., covering three gravel channels. Early production from this property is said to be \$3,600,000.

Mill Planned for Ramsey Comstock Mine

John B. Haley, manager of the Ramsey Comstock Company, operating the old Ramsey Comstock Mine in the Ramsey District, Lyon County, Nev., has announced plans for the immediate construction of a 50-ton cyanide mill. An electric power line has recently been extended to the property and arrangements made to sink a winze from the 500 level.

B. L. Thane, Mining Engineer of San Francisco, Dies in New York

Bartlett Lee Thane, prominent mining engineer of San Francisco, died of pneumonia in New York City on November 7 after an illness of three days.

Thane was born in Oakland 50 years ago. He was graduated from the University of California with the degree of mining engineer in 1899, then went to Alaska in the gold rush days and remained there until 1917. During this time he became associated with D. C. Jackling, in the Alaska Gastineau Mining Co., at Thane, Alaska, of which he was manager and later managing director.

For the past 10 years he has had his offices in San Francisco. During this time he made a comprehensive study of the coal and iron deposits along the Pacific coast. This led to an interest in the utilization of low grade coals and he recently built an experimental plant in Oakland for the low temperature distilla-

Seven Die in Fire at Magma Mine

Two men are known to have burned to death and five others are believed to have lost their lives in a fire in the Magma Copper Company mine at Superior, Ariz., November 24. The bodies were recovered. The fire was under control after burning from the 2,250-ft. level to the 1,600-ft. level.

United States Silver Production

The United States produced 4,930,000 fine ounces of silver in October, according to American Bureau of Metal Statistics, against 4,691,000 in September, 5,145,000 in August, and monthly average for 1927 of 4,933,700 ounces.

PERSONAL ITEMS

H. T. Hamilton, consulting mining engineer of San Francisco, has moved to New York, where he has accepted a position in the industrial department of the New York Trust Co.

H. C. Carlisle, consulting mining engineer of San Francisco, has recently returned from mine examination work in Mexico.

Edward J. Collins, vice president, and Thomas Collins, director of the Calumet & Arizona Mining Co., have recently visited the company's properties in Arizona.

Col. William B. Thompson, of New York, is at his winter home at Superior, Ariz.

Charles H. White, consulting geologist of San Francisco, has gone to Australia on professional work.

Pentecost Mitchell, of Duluth, vice president of the Oliver Iron Mining Co., is spending some time in California.

Hugh M. Roberts, consulting geologist, and W. G. Swart, consulting engineer for the Cusi Mexicana Mining Co., recently visited the mines of that company at Cusiuhiriachic, Chihuahua, Mexico.

Charles Rees, one of the consulting geologists with the Vanadium Corporation of America, has recently returned to this country from an investigation of mineral resources in Africa, occupying a period of 20 months. He was accompanied by W. Spencer Hutchinson, of the Massachusetts Institute of Technology. Previously, Mr. Rees spent six months in Peru.

G. C. Brown, secretary of the California Metal and Mineral Producers Association, has succeeded Robert I. Kerr as the California member of the General Tax Committee of the American Mining Congress.

J. W. Furness, of the economics branch of the Bureau of Mines, has been appointed chief of the mineral division of the Bureau of Foreign and Domestic Commerce of the Department of Commerce.

G. S. Ferguson, Jr., of North Carolina, has been appointed by the President as a member of the Federal Trade Commission, succeeding J. F. Nugent, of Idaho.

T. J. Mosley, editor of research publications of the U. S. Forest Products Laboratory, left November 1 to take the position of editor of the University of Wisconsin Extension Division.

TO STUDY NEW JERSEY POTASH-BEARING GREEN-SAND

AN EXTENSIVE cooperative investigation of the potash-bearing green-sand or marl, regarded as one of the most important undeveloped mineral resources of the State of New Jersey, has been proposed by State Geologist H. B. Kummel.

It is estimated that there is enough potash in New Jersey to supply the needs of the country at the present rate of consumption for 1,000 years.

The problem to be overcome is to develop commercial methods for the extraction of the potash from the green-sand at a cost which will meet foreign competition. Though Dr. Kummel can give no positive assurance that methods for commercial development can be worked out, he believes there is sufficient promise to justify an intensive study.

The state budget officers have been asked for an appropriation of \$5,000 a year for a period of five years to meet the salary of a competent potash chemist and for incidental expenses in connection with the investigation. Governor Moore has voiced his approval of the project and it is probable the work will be undertaken.

The green-sand deposits in New Jersey carry from 5 to 7 percent of potash and are from 20 to 30 feet in depth. They cover a wide area, close to the surface and near transportation lines. They occur in Salem, Gloucester, Burlington, Camden and Monmouth counties and are located in sections, Dr. Kummel says, which can be dug out by means of steam shovels.

Committee Being Formed to Consider Oil Legislation

The suggestion made by Secretary of Interior Work before the American Bar Association in August, that a committee of nine be formed to consider what best might be done from a legislative standpoint to check the waste attending the present methods of producing petroleum and to suggest further what should be done to insure the practical and actual conservation of our known potential oil resources, is gradually producing results, and it is expected that the committee, which is to consist of three representatives each of the American Bar Association, the American Petroleum Institute and the Government, will be completed shortly. The first meeting of the committee is to be held at Washington, December 10.

Three former presidents of the American Petroleum Institute have been selected to represent that body by President E. W. Clark. They are Thomas A. O'Donnell, of California; J. Edgar Pew, of Texas; and W. S. Parish, of Texas.

The American Bar Association has appointed a general committee on mineral conservation which is to select the three representatives of that organization, and Secretary Work has announced that the Government's representatives will be named when the Bar Association designates its spokesmen.

At the time that Secretary Work suggested the formation of the committee, he explained that the Federal Oil Conservation Board had repeatedly been petitioned by leaders of the oil industry

for such relief as might be extended by the Federal Government concerning what was termed "menacing overproduction," from the present great physical waste of natural gas in the production of petroleum, and from the general disarranged economic condition of the industry.

Various agencies and individuals, the Secretary explained, had suggested that legislation, Federal and state, is essential if the oil industry ever is to attain proper equilibrium. As custodian of the public domain and Indian lands producing about one-tenth of the annual output of petroleum in the United States, the Secretary of the Interior long has felt the necessity for definite measures which would afford ample and full protection to governmental and Indian rights, that will prevent the needless waste of gas and the improvident exploration and exhaustion of known petroleum deposits. Recognizing, therefore, the conditions which confront both the industry and the Government, and with the desire to advance every constructive measure that will bring equitable relief to all concerned, the oil board chairman ventured the suggestion that the oil industry, the lawyers of the country, and the Federal Government cooperate in a study of legislative needs.

Secretary Work explained that the oil industry has cooperated fully and helpfully in the past and now that the legal world has likewise evidenced a willingness to assist in the solution of a problem that has ever been complex, he is confident that much good eventually will come out of the conferences.

The Rolfe Prize in Economic Geology For Year 1927-28

C. W. Rolfe, professor of geology, emeritus, University of Illinois, has offered a prize of \$250 for the most valuable contribution toward a new, better, or increased use of any mineral resource of the State of Illinois.

Unpublished results of study, or papers or books published since May 1, 1927, and before May 1, 1928, may be offered in the competition; but the results of the study must show real present or prospective economic value.

The investigation may take the form of the discovery of mineral deposits which are economically valuable but not

heretofore known as occurring in this state; or of such treatment of minerals or admixtures, deposits of which are already known to occur in the state, as will add largely to their commercial value; or of new uses of any mineral resource of Illinois that will materially increase the market value of the resource; or of methods of recovery that will add considerably to the amount or quality of mineral which may be taken from the deposits; or, in short, anything that will make a worth-while addition to the variety, quantity, quality, or usefulness of the mineral resources of the state. The word *mineral* as here used includes oil, coal, mineral aggregates, mineral

waters, and soils, as well as the substance to which the name is commonly applied. In the case of soils, the study either must show new methods of soil treatment, which may be used by the ordinary farmer profitably, or it must show the adaptability of Illinois soils and conditions to the production of some crop which is not now generally regarded as of real agricultural value, but which can be raised profitably as a field crop.

The prize is open to anyone engaged in research, either private, commercially, or in connection with any university or college staff, or any state or national bureau or survey. The work must have been done, or at least completed, during the year named, and must be in the hands of the committee before May 1, 1928.

Further information may be obtained from the Rolfe Prize Committee, 209 Transportation Building, University of Illinois, Urbana, Ill.

The committee is made up of the following members: A. C. Callen, professor of mining engineering, chairman; J. C. Hackleman, professor of farm crops extension; M. M. Leighton, director, State Geological Survey; C. W. Parmelee, professor of ceramic engineering; S. W. Parr, professor of applied chemistry, retired; T. E. Savage, professor of geology.

Union Wages

Union wage rates averaged \$1.19 per hour in 1927 as compared with \$1.15 in 1926, according to the Department of Labor.

"Union wage rates have continued into 1927 the steady increase which has been almost uninterrupted during the past 20 years," says the Department. The report is based on a survey of time-work trades in 66 industrial cities, covering 750,000 organized workers. Of 73 trades covered, 64 received increased wages and 9 lower wages than in 1926.

There was also a reduction in hours of labor to an average of 45.2 per week.

As compared with 1913 union wage rates per hour have increased 159.5 percent, while full-time hours per week have decreased 7.6 percent.

A study of factors which determine the service life of clay refractories has been undertaken by the Bureau of Standards. It deals primarily with a study of fundamental qualities of raw materials used in their manufacture.

The American Manganese Producers Association, of which J. Carson Adkerson, of Woodstock, Va., is president, has opened headquarters in the National Metropolitan Bank Building, Washington, D. C.

HOLMES SAFETY ASSOCIATION FORWARDS MINERS' WELFARE

THE Holmes Safety Association, one of the most important agencies engaged in welfare work in the mineral industries, has attained a membership enrollment of 8,387, according to the U. S. Bureau of Mines, with which the association is closely affiliated. There are at present 176 chapters of the association distributed through 26 States. The association is named in commemoration of the late Dr. Joseph A. Holmes, first Director of the Bureau of Mines.

The association has as its purpose the improvement of health and safety conditions and the forwarding of the general welfare of all persons connected with the mining, metallurgical, petroleum, quarrying and allied industries. The chapters may include in their membership all persons, male or female, over 16 years of age, who are engaged in or fairly directly interested in the mineral industries; hence an effort is made to bind the homes to the mine, mill, quarry and plant in the broad activity of general community welfare.

Each local chapter has its own organization, fostered by the parent organization, of which Scott Turner, Director of the U. S. Bureau of Mines, is president, and each local organization arranges its own program of activities. In general, the meetings are held monthly, at night, and there are usually talks upon safety or allied subjects, together with entertainment features, such as singing, instrumental music, dancing, etc. In some chapters special or standing committees report as to conditions in the mine affecting health and safety, or the reports may concern conditions in the town or mining camp. The monthly letters furnished the parent organization indicate that these reports and the discussion upon them result in the correction of many unsafe and unhealthful conditions or practices in the mine, plant or town.

The chapters are not intended to sup-

plant any other safety or community organization, but rather to supplement such other activities or to aid in correlating them. In some instances, this takes the form of aiding the mine-safety officials in holding interest in first-aid and mine-rescue training, or in the dissemination of information as to what is a safe and healthful practice in mines or plants.

There is issued a monthly mimeographed letter combining abstracts from correspondence received from the various chapter as well as containing data of interest as to current practices in health or safety. Each chapter receives copies of the Holmes Safety Chapter Notes, as this monthly letter is called, hence each chapter is kept in fairly close touch with what the others are doing.

Alabama, with 38 chapters and a total membership of 1,693, leads all states in association activities. Illinois, with 28 chapters and 1,077 members, ranks second, while Pennsylvania, with 24 chapters and 1,449 members, is third. Iowa, Louisiana, Ohio, Indiana, Virginia, Washington, Tennessee, and North Dakota have specially well-organized chapters.

While it is gratifying that there have been organized 176 chapters of the Holmes Safety Association, with a membership of over 8,000, it is unfortunate that there are not 10 to 20 or more times as many chapters, President Turner points out. It is unfortunate also, he declares, that the membership does not include, in addition to the workers and officials engaged in or around the mines, quarries and plants, the families of those persons and of all others in the mining communities. Those interested in the establishment of chapters of the Holmes Safety Association should apply to the U. S. Bureau of Mines, 4800 Forbes Street, Pittsburgh, Pa., or to the U. S. Bureau of Mines, Washington, D. C.

Lorain Co. Abandons Ohio Mines

The four mines of the Lorain Coal & Dock Co., in eastern Ohio, which before the shutdown on April 1, were among the largest and best producers in that section of the state, closed on November 14, without the slightest indication when they will be reopened.

Orders to this effect were sent to the managers of the four mines by R. L. Wildermuth, vice president of the Lorain Coal & Dock Co., following a meeting of the officers of that company, at which the present situation in the mining industry in Ohio was discussed in detail.

All motors, mining machines and perishable equipment were ordered taken out of the mines and stored, and the mines boarded up. In addition, the company's organization at each mine was abandoned. Not even will pumpers be maintained in the mines, temporarily abandoned. Officers of the company declined to discuss the matter, insisting that the orders are self-explanatory.

Several months ago, the company announced that unless it could arrive at a satisfactory arrangement with their miners so that the mines closed since April 1, could be opened, they would abandon the Ohio mines and move all machinery and equipment into West Virginia, where they have large tracts of proven coal lands. Officials refused to affirm or deny that the removal of the machinery to West Virginia might be the final outcome of the closing of the mines.

Glen Alden Stock Split-up Looked for

At the December meeting it is expected that stockholders of the Glen Alden Coal Co. will pass favorably upon the proposal to divide the capital stock four for one. The stock has no par but has recently been selling for over \$180 a share, and this split-up would mean therefore a market of about \$45. The idea back of the plan is to make for a wider distribution of the shares and especially to bring it within the buying

capacity of the now more-or-less-moneyed miner.

No thought, however, is entertained of offering any stock through employer-to-employee methods, but that the miner, buying his shares through regular channels, would have a more proprietary interest in the company. The feeling seems to be that a better understanding would result and especially in time of industrial strife. The proposal first came before the directors about two years ago, but as it was during the time of the strike, action was delayed until a more propitious time.

Norton Coal to Rebuild at Kentucky Mines

The Norton Coal Mining Co. will rebuild at once its tipple, washer, machine shop, blacksmith shop, etc., at its Sunlight strip mines, near Madisonville, Ky., which burned September 25 from a fire discovered in the washer. Loss was adjusted with the insurance companies for \$57,500. This was one of the first of the strip mines in western Kentucky and is one of the largest, having a big production of good coal that is well prepared.

SURVEY OF COMMERCIAL COAL STOCKS

CONSUMERS' stocks of bituminous coal amounted to 61,900,000 tons on October 1, according to a survey completed by the United States Bureau of Mines early in November. In comparison with the final revised figure for July 1—63,400,000 tons—this is a decrease of 1,500,000 tons. On October 1, 1926, the stocks were 43,000,000 tons.

Exports during the third quarter of the year were normal, averaging 351,000 tons a week. Home consumption averaged 8,360,000 tons, as against 9,050,000 tons in the same period last year. The

decrease of 7.6 percent reflecting diminished activity in the steel, automobile and other industries. With colder weather, however, the weekly consumption tends to increase. In the last quarter of 1926 it averaged 11,200,000 tons.

In addition to the stocks of consumers there were 9,905,547 tons of bituminous coal on the docks of Lakes Superior and Michigan.

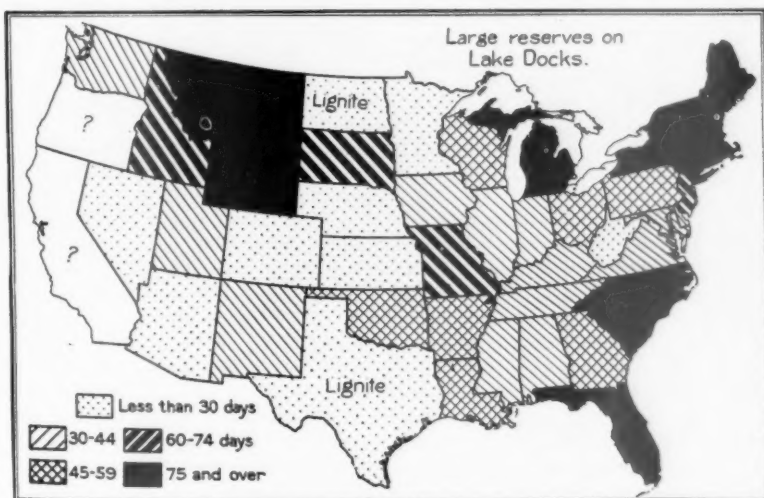
Stocks of anthracite are fully up to normal for this season of the year.

Pittsburgh Terminal Again Reduces Wages

The Pittsburgh Terminal Coal Corporation put into effect on November 9 wage reductions which average about 10 percent under rates paid when operations were resumed by strike-breakers. This was the second cut within a month. The wages of loaders were reduced 5 cents a ton on October 15. New scales provide for payment of 85 cents per ton for pick mining, compared with old rate of 94 cents; machine loaders will be paid 58 cents a ton, compared with 65 cents; cutters, 12 cents a ton, compared with 15 cents. Rate for day laborers will vary from \$4.50 to \$6.25 a day, compared with \$5 to \$6.50 on the old scale. About 1,700 men will be affected.

"The price of coal has steadily declined without any immediate hope for improvement and the company is compelled to curtail its expenses in every particular," said Horace F. Baker, president of the company, in announcing the decrease. "The company has no alternative except to close down its mines indefinitely. Coal can not be produced without loss on the rates of pay heretofore paid.

"In 1926 the mines of the Pittsburgh Terminal Coal Corporation were in operation and every employe of the company, if he had worked, would have received pay for 290 days," said Mr. Baker. "Since



DAYS SUPPLY OF BITUMINOUS COAL ON HAND AT INDUSTRIAL PLANTS OTHER THAN STEEL AND COKE WORKS, OCTOBER 1, 1927

At the rate of consumption prevailing in August and September, the industrial plants reporting had coal enough to last 62 days on October 1. In particular States, however, the reserves varied widely. New England, New York, Michigan, the South Atlantic States, and some other areas were heavily stocked. In the Middle West and Far Southwest the stocks were much lighter.

the resumption of operations in April the mines have operated virtually 100 percent of all work days. Some companies shut down when prices are low, but that is not the policy of the Pittsburgh Coal Corporation. The company stands ready to provide steady employment for the men at the scale noted. The company can assure its employees that no further downward revision of wages will be made for a period of at least one year."

Labor Leaders Ask President to Call Coal Conference and Investigate Alleged Price-Fixing

A delegation of labor leaders, including John L. Lewis, president of the United Mine Workers, and William Green, president of the American Federation of Labor, called upon President Coolidge on November 21 to point out to him what they termed "the present tragic and distressing situation in the coal industry," and at the same time submitted to him two definite requests:

First, that he include in his message to Congress a recommendation that Congress conduct an investigation into alleged practices of large railroads in depressing the price of coal for fuel purposes. The railroads purchasing methods, they said, are a great factor in fuel prices, the railroads taking 33 1/3 percent of the bituminous production.

Second, that the President call a conference of miners and operators for the purpose of reaching an agreement and ending the present situation.

"If the President would use his moral influence," Mr. Green said, "a settlement could be reached."

Mr. Lewis supplemented the charges concerning the alleged conspiracy between the railroads and the coal operators by mentioning specifically the Pennsylvania, Baltimore & Ohio and the New York Central as the principal roads which beat down coal prices. He stated that railroads in Illinois and Indiana will not purchase coal mined under the Jacksonville scale, and that the Pennsylvania hauls coal from Pennsylvania mines to those states at a higher cost than the coal could be purchased locally.

The delegation also called Mr. Coolidge's attention to the use of injunctions in the present situation, but did not recommend anything specific.

President Coolidge intimated that he would call a conference only in the event that both sides of the controversy were willing, and he has referred the matter to the Department of Labor. He suggested that the price-fixing charges be laid before the Interstate Commerce Commission.



Rocky Mountain News.

Better Hurry

End of Colorado Coal Strike Seen

With Governor W. H. Adams lending a mediating hand in an effort to effect an agreement between the striking coal miners and the operators in Colorado, the strike called six weeks ago by the I. W. W. is expected to end shortly.

Quiet prevailed generally throughout the regions affected following the skirmish on November 21 at the Columbine mine of the Rocky Mountain Fuel Company, at Lafayette, in which five strikers were killed. Responsibility for the deaths rests squarely on the strikers themselves, Governor Adams declared in a formal statement: "Chief Louis Scherf, of the state law enforcement squad, had every patience with the advancing strikers, and he ordered his men to fire only when it appeared his own life and the lives of his deputies were in jeopardy," the Governor said.

Thomas Annear, head of the state industrial commission, and Sterling B. Lacy, budget commissioner, saw the fight, and in their reports to the Governor supported the stand taken by the state officers.

Investigation of Colorado Coal Production Costs

Investigation of Colorado coal production costs as compared to those of other states is under way, under the direction of Thomas Annear, state industrial commission chairman. The probe is in answer to complaint by Colorado coal operators that they are unable to compete profitably with other coal fields, even at distances that should be favorable to Colorado coal. Colorado coal can be shipped profitably only as far as Hastings, Nebr.; Reliance, Kans., and a few miles into New Mexico, Annear said coal operators have complained. Wyo-

ming has its own coal, so has Utah, and New Mexico produces almost enough to keep Colorado coal out. Topeka, Kans., which should be a good market for Colorado coal, gets its coal from Illinois, Pennsylvania and Kentucky.

"Some of the operators tell me extremely low wages in some of the eastern coal fields is responsible for this condition to a large extent," Annear said. "Others say it is more a matter of freight rates that discriminates against Colorado fuel." Annear said the industrial commission has no idea of lowering wages for Colorado coal miners. If the investigation should prove that excessive freight rates are injuring Colorado coal operators, the matter may be turned over to the state public utilities commission for an action before the Interstate Commerce Commission to reduce these rates.

Movement of Lakes Coal Exceeds 1926

Despite coal strikes in many states during most of the year, coal movement on the Great Lakes from the opening of navigation up to November 1, 1927, exceeded tonnage moved during the same period in 1926 by 5,105,686 tons, reports completed by the Ore and Coal Exchange show.

Depression in the steel industry with many blast furnaces out of use resulted in a drop in the gross tonnage of iron ore moved during the season as compared with the last two years. Iron ore tonnage from the Upper Lakes dropped 5,458,238 tons up to November 1 as compared with the same period of last year.

With most of the iron ore already moved, figures compiled show that only 49,110,133 tons of iron ore have been moved from the Upper Lakes up to November 1 this year as compared with 54,568,371 tons in the same period of 1926, and 49,816,469 in 1925.

Officials of the Coal and Ore Exchange attribute the heavy movement of coal during 1927 to the mining of coal in the nonunion fields of West Virginia, lower Pennsylvania and Kentucky on an unusually large scale. Heavy production of coal in the nonunion fields offset the failure of union mines to contribute their share to the Lake coal movement.

Coal movement from the Lower Lakes to November 1, 1927, amounted to 30,802,196 tons, while during the same period of 1926, 25,796,510 tons were shipped.

Decision Reversed in Maynard Coal Case

The District of Columbia Court of Appeals has reversed the action of the District Supreme Court, which had granted an injunction to the Maynard Coal Co., of Pennsylvania, to prevent the Federal Trade Commission from requiring the

company to make monthly reports of the business of the company in relation to the mining output and production at the mines of coal produced by the company. The appellate court, through Justice Josiah A. Van Orsdel, directed the lower court to dismiss the company's suit.

The decision is based on the action of the United States Supreme Court, which held in the Claire Furnace case that until the Attorney General had taken steps to enforce any penalties provided by the law against the company, it can not suffer and when he does act at the request of the commission the company can promptly answer and have full opportunity to contest the legality of any prejudicial proceeding against the company.

That right being adequate, the company is not in a position to ask relief by injunction, the court points out.

Fire Damages Susquehanna Collieries Tipple

Fire the night of November 24 damaged the No. 7 breaker of the Susquehanna Collieries Company at Nanticoke, Pa., the largest operation of the company in the Wyoming Valley. The shaft from which coal is hoisted is more than 1,150 ft. deep. No estimate of the damage was available.

The flames were prevented from reaching the breaker proper, but the tipple which hoists all the coal that passes through the No. 7 and the No. 5 breakers was destroyed. About 5,000 miners will be idle until a new tipple can be erected.

Reporting on the coal situation, the American Railway Association says no difficulty is anticipated in the ability of railroads to meet the fall and winter requirements for coal and other open-top cars. It states that settlement of the Illinois and Indiana bituminous mine suspension has not caused any material increase in the output of bituminous, as coal produced by mines in those states since the settlement has been offset by a sharp curtailment in Kentucky and West Virginia fields. Bituminous production from January 1 to October 22 amounted to 426,149,000 tons, as compared with 445,592,000 tons during the same period in 1926 and 400,621,000 tons in the same period in 1925. Anthracite production from January 1 to October 22, 1927, amounted to 65,694,000 tons, compared with 68,214,000 tons during the same period in 1926 and 61,312,000 tons in the same period in 1925. Dumping of coal at lower Lake Erie ports from January 1 to October 16 totaled 29,093,155 tons, the highest for any corresponding period. This exceeded by 3,118,285 tons the best previous record made in 1923.

FEDERAL LINE URGED FOR EXPORTING COAL

THE ESTABLISHMENT of freight cargo service, carrying coal from Atlantic Coast ports to Mediterranean and South American ports, has been suggested to the U. S. Shipping Board by representatives of the coal industry. It was argued that such a service would aid in reaching a solution of the problem of overproduction of coal, as well as provide a means for furnishing additional employment to laborers and railroads.

The board's bottoms at present are not carrying coal, it was asserted by Shipping Board officials, because it was a low-grade commodity, the handling of which resulted in an operating loss.

Ports at which the cargo ships should touch include Philadelphia, Baltimore, Hampton Roads and Charleston. Arthur Hale, Washington attorney and counsel for several coal exporters, acting as spokesman for the delegation, said the service would compete with foreign tonnage and give the American exporters "a fair deal" in the matter of rates.

Included in the delegation which appeared before the board were W. T. Coe, of New York, representing the Consolidation Coal Company; John D. Battle, of Washington, traffic manager of the National Coal Association; S. M. Dubois, of Baltimore, representing the C. W. Handley Company of that city, and Hollis Stover, of Washington, W. Va., coal operator and head of the Stover Statistical Bureau.

Devenny Reelected Head of Williamson Operators' Association

At the annual meeting of the Williamson Operators' Association, held in Williamson, W. Va., the latter part of October, Thomas Devenny, of the Portsmouth By-Product Coke Co., was again chosen president of the association. State Senator L. E. Woods, of the Crystal Block Coal Co., was named as vice president of the association; W. S. Leckie, as treasurer, and George Bausewine, Jr., as secretary.

The new executive committee has the following personnel: George Dungleison, Jr., Thomas H. Huddy, G. C. Wood, H. T. Wilson, G. F. Downey and George W. Coffey.

Hugh Morrow Heads Alabama Operators

At the annual meeting of members of the Alabama Mining Institute, held the latter part of October in Birmingham, the following operators were elected as members of the Board of Governors for a term of three years: H. T. DeBardeleben, president, DeBardeleben Coal Corporation, Birmingham; C. T. Fairbairn, manager, Southern Division, Republic Iron and Steel Company, Birmingham; and J. Molton Smith, president, Aetna Coal Company, Birmingham.

The other members of the board are: George F. Peter, president, Southern Coal & Coke Co., Boothton; Chas. F. DeBardeleben, president, Alabama Fuel & Iron Co., Birmingham; Frank H. Crockard, president, Woodward Iron Co., Woodward; A. B. Aldridge, president,

Stith Coal Co., Birmingham; Walter Moore, president, Pratt Fuel Corp., Birmingham; and M. W. Bush, president, Alabama By-Products Corp., Birmingham.

A meeting of the Board of Governors was later held, at which these officers were elected: Hugh Morrow, president; A. B. Aldridge, vice president; James L. Davidson, secretary-treasurer.

Harold McDermott, vice president, Newcastle Coal Co., Birmingham, was elected as member of the Board of Governors to fill vacancy occurring by reason of resignation of A. B. Aldridge, who was elected vice president.

New Pennsylvania Mine to Start Soon

It is reported from Luverne County, Pa., that the Haddock Mining Co., which is opening the new Salem Hill colliery near Palo Alto, has its tunnels down about 900 feet and will begin mining coal during the latter part of December or early in January.

Zenith Furnace Co. Additional Coke Ovens

The Zenith Furnace Co., of Duluth, Minn., has announced its plans to build an additional battery of modern coke ovens and to enlarge its coal dock at Duluth, at an estimated cost of \$3,000,000. The enlarged coal dock will have an annual handling and storage capacity of 1,000,000 tons. Preliminary work has been started and will be carried on during the winter with a view to completing the entire program of dock extension and coke ovens construction by the fall of 1928.

Investigating Ohio Blast

Dynamiting of the tippie of the No. 1 mine of the United States Coal Co., at Bradley, Ohio, four miles east of Steubenville, at a loss estimated at about \$30,000, will be investigated by state and Federal authorities. Sheriff W. T. Allison said that he had found that between 45 and 50 sticks of dynamite had been planted near the loading platform of the tippie, but all had not exploded. Had all the dynamite gone off, the tippie would have been completely destroyed. The mine is one of the most modern in the Steubenville section and is electrically operated. It has not been operated for some time and officials announced they were not contemplating putting it into operation.

Kentucky Miners Restrained

Federal Judge Charles I. Dawson, of Louisville, for the western district of Kentucky, has granted a temporary injunction restraining a large number of miners of Henderson, Ky., from interfering with the men employed at the mine of the Southland Coal Co., at Henderson.

About 300 men went on strike at the plant in early October, and have interfered with men who desired to work. Workers have been fired upon, beaten, and dynamite exploded in their yards, and a number of arrests have been made.

This is the only mine in the state reporting any material trouble at this time. The strike was reported to have started when men demanded extra compensation for removal of a clay parting, which the company claimed was cared for in a higher wage level than paid by other companies in the district.

West Kentucky Wages Reduced

The expected reduction in western Kentucky mine wages went into effect under decision of the Western Kentucky Coal Operators' Association, which voted to take off the August increase of 20 percent, at a meeting held in Central City, Ky., on October 31, the reduction being effective November 1. The increase was on the 1917 scale, which puts that scale back into effect.

J. A. Smith, president of the association, speaking for the operators, said the action was caused by a collapse of prices of western Kentucky coal, brought about by increased freight rates to northern market, and reopening of the union mines in Indiana and Illinois.

About 12,000 coal miners are affected by the action of the operators. The increase in August was voluntary at a time when movement was heavy and prices good.



International Newsreel.

Flame and smoke bursting forth from the open end of the explosion gallery, after travelling 500 feet through a cloud of coal dust.

Coal Dust Explosion Tests in England

The photographs shown here were taken at the Safety in Mines Research Station at Harpur Hill, Derbyshire, England, where extensive tests have been made to determine the causes of explosions in coal mines, and at the same time plan, if possible, to prevent them in the future.



International Newsreel.

Connecting instruments to record the passage of the flame in the coal-dust explosion gallery.

Accident Prevention Course at New York University

In response to the increasing demand for trained leaders in safety work, the first collegiate course in accident prevention was given last year at New York University under the direction of the Extension Division in cooperation with the American Museum of Safety of New York City. The course opened last October with an enrollment of 55 persons.

This course for the training of safety engineers and public safety directors began its second year on October 3.

Coal in Northeastern Wyoming

The Gillette coal field, in northeastern Wyoming, contains over 14 billion tons of coal in workable seams, according to a report recently issued by the Geological Survey, Department of the Interior, as Bulletin 796-A. The huge tonnage of this single coal field may be compared to the total amount of coal mined to date from all the coal mines in the United States—17,800,000,000 tons. Two of the Gillette coal beds are together 75 ft. thick.

This coal field is described in the report by geologists C. E. Dobbin, V. H. Barnett, and W. T. Thom, Jr., which may be obtained from the Superintendent of Documents, Washington, D. C., for 35 cents. The field lies principally in Campbell County, but includes also parts of Crook, Weston, Niobrara, and Converse counties. It contains several country mines and prospects from which small quantities of coal have been obtained for domestic use, and some of the ranchers mine their own coal from the nearest outcrop, usually a bluff along some stream where the weathered coal is kept washed away by freshets.

Most of the coal reserves of 14,500,000,000 tons in this field can be recovered by stripping. Coal of a slightly superior rank and heating value is now being mined in this way on a large scale south of Forsyth, Mont., for use as locomotive fuel, and it is reported that stripping operations are soon to be begun near the Peerless mine, near Minturn.

A considerable part of the coal in the Gillette field is owned by the United States and is subject to development under Government lease in accordance with the provisions of the act of February 25, 1920, commonly known as the mineral leasing law.

Colorado Coal Lands to be Auctioned

Eighty acres of coal land in Routt County, Colo., near the McGregor coal camp, will be auctioned December 7, in the office of Walter Spencer, registrar of the United States Land Office. Lease of this will be given to the bidder offering the highest bonus. The successful bidder also must pay 15 cents a ton royalty on the mine run and must make an initial investment of \$1,000 during the first three years. The production must total at least 700 tons a year, commencing with the fourth year.

According to the Department of Labor, accidents in the iron and steel industry continued to decline in 1926. The accident frequency in a large group of selected plants was 6.8 per million hours exposure in 1926 as compared with 8.2 in 1925 and 60.3 in 1913.



A Modern Gulliver

Philadelphia Public Ledger.

MOUNT CARMEL HOLDS ANTHRACITE CONFERENCE

NEARLY a thousand delegates, representing mine workers, mine operators and the general public in the anthracite region, were in attendance when the anthracite cooperative conference, sponsored by the Mount Carmel, Pa., Chamber of Commerce, opened in that town Wednesday morning, November 9. Enough visitors, not officially listed, to fill the Victoria Theater to overflowing were on hand when Dr. W. R. Buckley, president of the Mount Carmel Chamber of Commerce, called the meeting to order.

Bishop James H. Darlington, of the Episcopal diocese of Harrisburg, who was presented to make the opening prayer, prefaced it with a short talk advising mutual consideration and co-operation. Ralph E. Weeks, of Scranton, permanent chairman, made a more extended address along the same general lines, and the first concrete propositions were then introduced by Charles Coolidge Parlin, of the research department of the Curtis Publishing Company. He recommended national advertising for hard coal, and went into some detail on the psychological phases of such advertising. Two of his suggestions were characteristic and thought provoking. One was that the matter of health be stressed, for he said that many people waited too long in the fall before starting fires and ceased firing too early in the spring. Another was the statement that surveys show that while 88 percent of the farm home have automobiles only 23 percent have furnaces. He thought there was room for great expansion of anthracite trade among farmers.

The big feature of the opening day was the appearance of Secretary Hoover, who had not been expected to come, but who changed his mind at a late hour. He was the chief speaker in the afternoon. Mr. Hoover's central idea was a maintenance of high wages, to be made possible by eliminating waste of time and materials both in production and distribution.

"That elimination," he said, "is the only true foundation for higher wages and stability of employment." He also recommended that the conference, and ultimately the miners and operators, "replace questions of conflict with discussions of questions of joint interest. The very fact that you have successfully organized this conference, that it is attended by leaders on all sides of the industry in itself is an evidence of a march in the spirit of cooperation." The anthracite troubles of recent years, he held, were due to dislocations following the war.

Governor John S. Fisher, in a brief talk, made two principal points. He said the anthracite tonnage tax should be repealed, but there was a string to it, for, he said, in effect, that the state needed the money and if the tax were repealed some other source of equal revenue would have to be determined in advance. He said that from the first he had opposed the tax as an unsatisfactory way of raising revenue, but, he added, that if it were repealed the price of coal should be correspondingly reduced. His other point was that existing freight rates discriminated against Pennsylvania coal in its natural markets and gave an advan-

tage to southern coal. He also said the state was carefully surveying anthracite accidents. The records, he said, indicated that half of them were due to preventable causes. He disclaimed trying to blame anyone, but added that the elimination of these preventable accidents would save more than a million dollars a year to the industry.

At the evening session the principal speakers were President S. D. Warriner, of the Lehigh Coal and Navigation Company, chairman of the Anthracite Operators' Conference, and President John L. Lewis, of the United Mine Workers. Mr. Warriner recommended cooperation, advertisement of the region and the industry, complete service to the consumer, research into improved mining and combustion methods, revision of anthracite freight rates, and more comprehensive sales effort to meet and counteract competition.

Mr. Lewis admitted that the five-year period of the existing wage agreement gave an opportunity for comprehensive efforts to rehabilitate the standing of anthracite. On behalf of the mine workers he flatly disowned responsibility for the anthracite strikes of the last five years. He said the so-called anthracite problem is not one of price, but one of quality and service. He said that any one who thought that solution of the anthracite difficulties depended upon wage reductions or the arbitration of the fundamentals of wage agreements need not try to impose such views on the mine workers. In a departure from his prepared address he suggested that the existing agreement be extended five years from its expiration.

Among the prominent visitors at the opening sessions was Senor Carlos Davile, Ambassador of Chile to the United States. He was accompanied by Senor Frederico Gacio, counsellor of the Chilean Embassy, who made a brief speech of good wishes at the afternoon session, and said he was interested because some of the problems to be discussed had counterparts in Chile.

It became apparent on Thursday that the convention, billed to run over into Friday, could be completed more rapidly, and final adjournment was effected Thursday evening. Mayor Thompson, of Chicago, was one of the picturesque figures of Thursday. He said that the miners and operators should follow the example of Canada and the United States. He said that if it were known that there was to be peace for a quarter-century anthracite would regain all its old trade within a month.

Thursday was given over largely to representatives of the retail trade. A. R. MacDonald, director of development for the A. W. Shaw Company, of Chicago,

made a short address, and Dr. Benjamin I. Miller, of Lehigh University, recommended that advertising and scientific research be used to gain and hold anthracite trade. Joseph E. O'Toole, secretary of the National Retail Coal Merchants' Association, suggested that the next meeting of that body be held in Mount Carmel, and added that Secretary Hoover might be asked to make a survey of the region and give advice. If anthracite is maintained to its proper standard, he said, the retail men could be relied upon to market it. Additional addresses were made by Charles B. Staats, of the New York Retailers' Association; Hiram Blauvelt, of Hackensack, N. J.; Wellington Bertolet, secretary of the Pennsylvania Retailers' Association; F. J. Moran, of Hartford, Conn.; and W. A. Clark, president of the New England Association. Mr. Clark was emphatic as to the necessity for cheaper fuel, properly prepared, and gave his opinion that many of the troubles in the industry were due not to the operators but to the sales departments. Roderick Stephens, of New York, made the final address for the retailers, and Dr. D. F. Garland, director of welfare for the National Cash Register Company, gave the views of the outside world which had wanted anthracite and could not get it. He also stressed the idea of partnership between employers and employees.

Floyd Allen, assistant to the president, General Motors Company; Henry T.

Myers, director of sales, Chrysler Motor Company; and Rex Rathbun, sales promoter of the Burroughs Adding Machine Company, gave their ideas on modern sales methods as applied to anthracite.

Thomas Kennedy, secretary-treasurer of the United Mine Workers, made the principal address Thursday night on the subject of "Cooperation." He said that the miners were ready to cooperate, and expressed the opinion that if the consuming public knew everything it would favor "improvement and the elevation of those standards of wages and conditions. The miner pays and pays in sweat and tears and blood and grime to produce coal for the needs of society."

At the final session it was announced that a permanent organization committee had been formed: For the operators, D. T. Pierce, of New York; E. H. Suen-der, Frackville. For the United Mine Workers, Thomas Kennedy, of Hazleton; Chris J. Golden, of Shamokin. For the coal merchants, Joseph E. O'Toole, Washington, D. C.; Wellington H. Bertolet, of Reading. For the public, Raymond B. Gibbs, Scranton; C. W. Laycock, Wilkes-Barre; Dr. W. R. Buckley, Mount Carmel; J. H. Paul, Carbondale; W. A. Dyatt, Hazleton; O. L. Underwood, Pottsville; W. K. Armstrong, Shamokin; J. C. Noonan, Mahanoy City; W. H. Blanning, Lykens.

This committee met a week later to consider the problems of the anthracite industry and the possible solutions.

Center of Production of Electricity in the United States by Public-Utility Plants

The center of production of electricity by public-utility power plants in 1907 was located about 45 miles northeast of Chicago. In 1917 the center was about 65 miles west by north of Chicago, having moved about 85 miles in a south-westerly direction in the 10-year period since 1907. In 1926 it was 55 miles west by south of Chicago, having moved about 20 miles in a southeasterly direction from its position in 1917.

These figures, computed by A. H. Horton, of the Geological Survey, are based on the production of electricity by public-utility power plants in the United States as published by the Bureau of the Census and by the Geological Survey.

The relatively small movement of the center of output since 1907 is an indication of the general increase in utilization of electricity in all parts of the country. During the period from 1907 to 1926 the output increased from 10.6 to 73.8 billion kilowatt-hours, or nearly 600 percent in the 20-year period. The increase in population during the same period was only 34 percent. The relative increase in total output is about the same as the relative increase in the per capita use of electricity, which in 1907 was 122 kilowatt-hours and in 1926 was 630 kilowatt-hours.



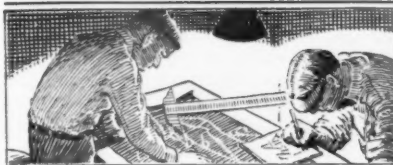
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Good? How can he be anything else in those surroundings?

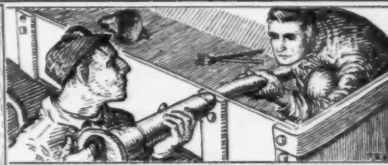


Cincinnati Enquirer.

Our Thanksgiving Inspiration



WITH THE MANUFACTURERS



Hercules New Explosive

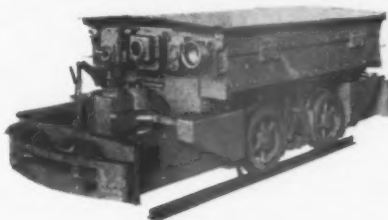
In reviewing outstanding features of their work during 1927, the Hercules Powder Company, Wilmington, Del., call attention to their new explosive known as Hercules Extras No. 2 to No. 7, which is divided into six powders of different cartridge counts. They further say:

"Hercules Extras are our latest achievement in producing explosives for more economical blasting. Hercules Extra No. 2 to No. 7 is a series of explosives with very high strength, all being approximately 70 percent strength by weight. The important difference in each grade is cartridge count. This ranges from approximately $240\frac{1}{4} \times 8$ cartridges per 100 lbs. in Hercules Extra No. 2 to approximately $350\frac{1}{4} \times 8$ cartridges per 100 lbs. in Hercules Extra No. 7. This variation in cartridge count gives a series of powders ranging from a low cartridge count, strong cartridge strength powder in No. 2 to a high cartridge count weak cartridge strength powder in No. 7. Due to the high explosive content and corresponding high strength, these powders at their price have the greatest explosive value of any of the powders. Being high count and ranging from high count to very high count, these powders present a series of low cartridge cost powders. Since a cartridge of these powders can often replace a cartridge of some powder costing more, there is an appreciable saving for each cartridge used. With the series one can choose a powder of suitable cartridge strength and in that powder will find the greatest explosive value and most economical powder.

"These powders have been designed with a minimum of objectionable fumes and are suitable for open and underground work. These powders are less sensitive to flame, shock, friction, and impact than some of the other explosives, and are therefore among those that are relatively the safest to use. They are of the usual Hercules high quality, and are manufactured only on the latest improved low-freezing formulae. This new series presents a decided step forward in the explosives industry. The desirable characteristics and economy of these new powders place them in an important position in blasting work.

"Much blasting work will continue to require other types of explosives on account of certain desired characteristics,

but where these powders are suited to the work they will do it economically. This new and improved series should replace all of the special powders, a considerable amount of extra dynamite and some gelatin, and should fill a need for a variety of such powders of varying cartridge strength and cartridge cost."



New Permissible Locomotive

The new permissible storage-battery locomotive of the Atlas Car & Mfg. Co., Cleveland, Ohio, has been approved by the United States Bureau of Mines, as a "permissible" locomotive for use in gaseous mines. It is of the two-motor type with one motor driving each axle by means of double spur gear reduction in patented drive housings which are arranged to entirely enclose the gears in an oil bath and arranged so that all the gearing is mounted on heavy duty ball bearings. The gears are of the automobile type, hardened and heat treated. The shafts are of chrome vanadium steel hardened and heat treated. The main journal bearings are also heavy duty ball bearings of the double row type and are mounted on chrome vanadium steel axle shafts.

The controller is of the series-parallel type with six speeds forward and reverse, and the usual equipment is included, such as resistors, headlights, ampere-hour meter, disconnecting switch and fuses, charging plug and receptacle, all of which have been duly passed and approved by the Bureau of Mines.

The first locomotive of this type was installed at the Bartley mine of Pond Creek Pocahontas Co., at Bartley, W. Va. The machine was installed with a guarantee that it would gather 75 cars per day with a battery of 48 cells PML39 without entirely exhausting the battery. This locomotive has often succeeded in gathering in excess of 100 cars per day, the record achieved being 115 cars gathered in one day without entirely exhausting the battery.

Low-Speed Motor

A new low-speed synchronous motor, called the type HR, has recently been placed on the market by the Westinghouse Electric and Manufacturing Company. This motor is the most modern and highly developed drive yet devised for slow-speed machinery where direct connection is applicable. While arc-welding has been used to some extent in Westinghouse motors for 15 years, it reaches its greatest application in this motor. Its parts have been specially designed for ease in handling and ease in assembling in the field.

This motor has been designed for high efficiency at all loads within its normal operating range. High efficiency at fractional loads is a great power saver, since few applications require the maximum output of the motor. The excitation has been materially reduced, thus increasing the efficiency and cutting operating costs. A difference of 1 percent in efficiency on a 200-hp. motor running 24 hours a day for 250 days a year means a difference of \$250 with power at 3 cents a kw.

A starting torque of 50 percent and a pull in torque of 40 percent are features of this new motor. The higher the starting torque, the quicker the motor will come up to normal running synchronous speed. The disturbance on the line is correspondingly reduced. This higher-than-usual torque is also a valuable asset under such unusual conditions as starting a machine while it is still new and stiff or after it has been standing for a considerable time. Low-speed motors naturally have very little windage effect, so that cooling is effected largely by radiation. As heat has a deteriorating effect on insulation, a cool-running motor will have a long life. The shape of the rotor arms in this new motor is such that a large amount of air is set in motion. This cooling air is so directed that it not only passes through the stator coils but it also passes over a large area of the stator laminations as well. A means of varying the flywheel effect is an attractive feature of the new, type HR, synchronous motor. By means of different weight rings bolted to the rotor rim, six possible values of flywheel effect are available. This motor is particularly desirable for driving refrigeration machines and air compressors, although in the coupled type it is equally desirable for driving Jordans, pulp grinders, pumps, and other slow-speed machinery.

Flory High Speed Hoists

The S. Flory Manufacturing Co., Bangor, Pa., have put out a number of high-speed scraper hoists during 1927. The machine is compact, designed for a rope speed of 600 ft. per minute, using a 40-hp. motor, with silent chain motor drive, and roller bearing thrusts for the friction clutches, which is said to have greatly increased efficiency. In further describing this equipment, the company says:

"All gears are cast steel with machine-cut teeth. Frictions are of the cone type and lined with formed asbestos mounted on solid flanges of the gear, which makes a very rugged clutch and will stand the amount of slipping required in good practice for handling a drag scraper bucket. The base for housings and bearings is made in one piece. The operation consists of handling one lever for two frictions and a double foot treadle for both brakes. We have even found it quite practicable for this newly developed machine to use a squirrel cage motor, thereby requiring only a hand starter and doing all the actual work with the friction and brake levers. We have used the silent chain drive on the standard speed machine, which runs at 325 ft. per minute, for about three years and have had very satisfactory results. The first high-speed machine has been in operation about 10 months, and one coal company has repeated its orders until it now has 12 machines."

The Electric Controller & Mfg. Co., Cleveland, Ohio, is now supplying their standard type ZO across-the-line starting switches, for small a.c. motors, in iron-clad tank, which makes them suitable for operation in atmospheres where acid fumes are present. Like the standard E. C. & M. type ZO starting switch, all of the contacts, including the overload trip, open and close under oil, so this starter is flame-proof. There is a machined fit between the cast-iron cover and tank, thus making the starter rain-proof.

Trico Announces a New Fuse Puller

The Trico Fuse Mfg. Co., of Milwaukee, Wis., has just placed on the market the new combined Trico midget fuse puller and screwdriver. This tool is made of genuine horn fiber and is 5 inches long. It is mounted 20 to a display card, or can be obtained in small individual cartons. One end has gripping jaws for handling small cartridge fuses $\frac{1}{4}$ in. to $\frac{1}{2}$ in. in diameter. The other end has a screwdriver for use on small screws as found on electric sockets, plugs, radio apparatus, etc. Literature and prices sent on request by the manufacturer.



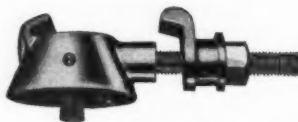
Ohio Brass Introduces New Trolley Frog for Mines and General Industry

A "hard service" frog is the description the Ohio Brass Company, Mansfield, Ohio, gives its new patented MBC trolley frog, for use in mine work and exacting duties of all kinds in the industrial field.

It is said that this frog is made to reduce wear, tear and strain on overhead wire, trolley wheel, trolley base and frog itself, since designed to be placed farther toward the switch point, thus permitting the wheel to follow closer the direction of the car on the curve. This is said to cut out a great part of the drag of the wheel against the wire, and that lessens angle wear on both wire and wheel and unnecessary stress on the trolley base. The longer runners of the frog also keep the wheel on a natural track instead of bumping along where it will cut the pan of the frog and mushroom flanges of the wheel. The manufacturer also announces that it is equipped with the O-B bronze renewable cam tip, which makes an ideal device for the operator who stresses savings.

The body of the MBC frog is made of malleable iron with four pull-off eyes for tie-in of the span wires. The runners are built high enough to keep the wheel flanges from cutting the metal between the pull-off eyes and frog body. A galvanized clamp with $\frac{1}{2}$ -in. machine bolt anchors the device to the trolley wire.

This 15-degree frog conforms to A. E. R. A. specifications. By correct placement it will take care of practically all kinds of trolley turn-outs. It is made right and left hand in sizes to fit 3-0, 4-0, and 6-0 round and grooved wires and 4-0 Fig. 8 wire.



O-B Hanger for Mine Use Is a Two-in-One Device

The Ohio Brass Company, Mansfield, Ohio, is now producing the new insulated I-Beam Hanger, a device which they say involves an idea never before incorporated in similar devices offered to the mining industry.

This new product, simple and efficient, is for use in suspending trolley lines on I-beam roof supports, and unlike all other devices of the same character is a two-way device, being a handy, com-

pact combination of hanger and clamp. Its use will, it is claimed, result in substantial economies for the mine operator for two good reasons. First, labor cost for installation is much less than that for installation of other clamps, due to the fact that it eliminated the double operation necessary in the installation of the old-fashioned clamps. All that has to be done to install the I-Beam Hanger is to hook it over the edges of the I-beam and tighten the holding nut. Second, the decreased volume of materials used in its construction means a saving in the cost price as compared with that of the bulkier devices on the market.

Insulation provided is the usual O-B Dirigo insulation used in the manufacture of all O-B devices needing such treatment. This insulation is known to yield a high degree of dielectric and mechanical strength, with successful acid resisting properties inherent. The hanger shell and clamp are made of the well-known O-B Flecto hot-dip galvanized iron.

The new I-beam hanger is made to fit I-beam or rails with 3 to 5 in. bottom width dimension, and is also furnished on order in special sizes to fit roof supports smaller than 3-in. and larger than 5-in.

Electro-Pneumatic Mine Hoist Control

The Montreal Mining Company, Ironwood, Mich., has an order with the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., for electric pneumatic control for operation of a 600 hp., 2,200-volt wound rotor mine hoist induction motor. This hoist will operate unbalanced on an inclined shaft of 62° and will be used for handling men and supplies.

When lowering the cage the hoist motor will run slightly above synchronous speed and return power back into the power system or what is commonly termed regenerative braking.

This will be the first installation of electro-pneumatic mine hoist control in the Lake Superior region, and is of particular interest due to the type of control and the unusual arrangement of the control system.

When lowering, the master controller is pushed past the first three points to the fourth point, which is the full speed lowering position. The hoist motor quickly brings the moving parts up to full speed with all accelerating contactors closing in sequence. The operator has but one speed control point on lowering and can not operate the hoist except at the safe lowering speed.

When hoisting the cage the control will provide seven speed points in the same manner as is commonly used on all mine hoist control.

Roberts and Schaefer Acquire Menzies Hydro Separator

The following announcement is of special interest:

"In order to meet a decided need for improved coal cleaning methods in new tipples, as well as those already in existence, the Roberts and Schaefer Company have acquired the Menzies Hydro Separator, which they are now selling in combination with the Arms concentrator as a complete wet and dry process for cleaning and separating coarse and fine coal sizes.

"The special design of this modern cleaning equipment makes it a most practical method for cleaning all coal sizes from egg to pea. It provides a combined wet and dry process Menzies Hydro Separator for coarse sizes and Arms air concentrator cleaning tables for the finer sizes.

"The disadvantages of sludge, moisture and other obstacles are eliminated by the Hydro Separator system, which does not attempt to wash fine coal, but subjects these finer sizes to an upward moving current of air to stratify the bed, and a reciprocating motion and transverse slope to move the refuse to the end and the coal to the side of the concentrator.

"The coarser sizes, cleaned by the Menzies Hydro Separator, or wet process, are not affected by a sufficient percentage of moisture—the moisture adhering to washed coarse sizes is infinitesimal—to increase the moisture content of the coal to be shipped, whether shipped separate or combined, as mine run, or nut and slack.

"The design and construction of the Hydro Separator remove the necessity for unnecessary pumping of water. The unit is small compared with its productive capacity—empty weight 2,750 pounds, working weight 4,500 pounds—which varies from 25 to 40 tons per hour feed, depending on the size and quality of clean coal desired.

"The ability of this mechanism to clean egg up to 4½-in. or 5-in. round hole, places at the operator's disposal an equipment that will pay for itself immediately through the elimination of numerous men on picking tables—men employed to pick not only egg but nut sizes."

The Roberts and Schaefer Company will gladly send a copy of Bulletin No. 102 to operators interested in the improved cleaning method.

The Hill Clutch Machine & Foundry Company, Cleveland, Ohio, has established a New York office at Room 528, 30 Church Street. Mr. Charles C. Phelps, sales engineer, is in charge. At this office there are working models of several "Hill Clutch" products that are highly interesting and instructive.



New Cable Splicer

The American Mine Door Company, Canton, Ohio, has developed a new cable splicer for splicing machine and motor cables.

It was found that many electricians, instead of meshing the strands of the broken cable ends, laid one cable end over the other. This idea led to the adoption of the oval shape splice with which this latter method of splicing cables has been simplified.

The oval shape splice does not slip when being pounded together and, as it closes around the cable ends, it assumes a circular shape.

Machine Guards from Chain Link Fabric

At the plant of the Dominion Chain Company, Niagara Falls, Ontario, the workmen are shielded from flying belts, whirling pulleys, and dangerous gears by an improvised guard made from piping, angle irons and pieces of Page chain link fence, according to an announcement by the Page Steel & Wire Company of Chicago. According to the plant superintendent, this guard is well adapted to the needs of the workmen. It is inexpensive, obstructs no light, and hides no wearing parts that might need attention.

Contract Awarded American Rheolaveur Corporation

The Pittsburgh Coal Company has recently awarded the American Rheolaveur Corporation, a contract which calls for the erection of a combined tiple and washing plant for the preparation of 13,500 tons of coal per day. This is said to be the largest preparation plant that has ever been built.

In announcing this arrangement, which permits the Pittsburgh Coal Company to use the Rheolaveur process for the washing of bituminous coal, the Rheolaveur Corporation says:

"Coal will be assembled at this central cleaning plant, known as the Champion Preparation Plant of the Pittsburgh Coal Co., from five mines in the vicinity.

"The plus 4 in. will be separated into two sizes and carefully hand-picked before being sent to loading booms for loading into those sizes or as mixed sizes. The minus 4-in. coal will be washed in the Rheolaveur washing plant in sizes from 4 in. to 0. The ½-in. by 4-in. coal will be dewatered and sized on shaking screens, and the minus ½-in. coal will be dried in Carpenter driers.

"Tests have been made and equipment will be installed whereby the moisture in the washed coal will be lowered to a point where it will preclude any possibility of freezing during shipments.

"There will be many novel schemes for the handling of sizes and the mixture of a combination of sizes in this plant. The plant itself will be of steel concrete and brick and will be designed to give a good appearance architecturally.

"A water-recovery system will be installed, so that the amount of water which will be necessary for make-up water will not exceed 150 gallons per minute. No expense will be spared to make the plant mechanically and electrically of such a design as to require the minimum amount of labor.

"The decision to use the Rheolaveur process for this preparation was made after five months of special and careful investigation by engineers of the Pittsburgh Coal Co. assigned to this work. Careful float and sink tests with ash and sulphur analyses of the various coals from the various mines were completed. Investigations of various processes for the cleaning of coal were also made."

Timken Reports for Year

According to E. R. Phillips, manager of the Mine Car Division of The Timken Roller Bearing Company, of Canton, Ohio, this year has been marked not only by a steady increase in the use of Timken Bearings in mine cars proper but by the beginning and increase of their use in electric mine locomotives. With regard to the first point, two features are notable, the number of cars equipped shows a gain of 77 percent over last year's total, and of the orders received 60 percent were repeat orders from concerns who had already been operating Timken-equipped cars.

As to the second point, the use of the bearings in electric mine locomotives has been extended to include the armature shafts of the driving motors as well as the journals of the locomotive itself. The considerations governing the former were the ability of the bearings to withstand the thrust and shock loads transmitted from the driving mechanism of the locomotive, as well as the vibration and racking caused by travel over rough and uneven tracks, and their ability to operate over long periods without frequent or extensive renewals of lubricant. All of these features will contribute toward effecting a decided improvement in the economic and practical phases of locomotive operation. The application of the bearings to the journals has come about as the logical result of their proved success in meeting practically the same requirements in the wheels of mine cars.

Review of Former Denver Rock Drill Mfg. Co.'s Activities

In reviewing the activities of the former Denver Rock Drill Manufacturing Company, in a recent letter they say:

"Our company is now the Gardner-Denver Company, with headquarters at Quincy, Ill., and Denver, Colo., with 20 domestic branch offices and with agencies in Canada, Mexico, Peru, Chile, Japan, South Africa, England, Australia and New Zealand.

"The combined lines of the two old companies are complementary, enabling us to now offer to the mining trade a very complete service on pumps, compressors, governors, rock drills, drill steel sharpeners, air and electric hoists, and allied accessories. Our products, moreover, are no longer confined exclusively to the mining industry. A new line of Gardner-Denver portable compressors in five sizes, with pneumatic rock drills, concrete breakers, clay diggers, and sheeting drivers has so broadened our field that all types of industries are embraced, particularly municipalities, railroads, traction companies, oil producers, quarries, light and power companies, and engineering construction in all its branches.

"In mechanical developments during 1927 perhaps the most important has been the addition of the previously mentioned gasoline engine driven line of portable compressors in Class 110, 160, 220, 250 and 310 sizes. These outfits are Buda engine driven, and the compressor unit is better known to the trade under the old name of "Gardner Duplex Vertical" single stage.

"In the rock drill line we have developed, placed in production, and are meeting with great success in marketing our new Model 11 Waughhammer. This is a machine of conventional rifle bar rotation design, in the 50-pound class, but possessing superior drilling speed and unusually smooth drilling qualities because of more efficient design and valve action."

The Mine Safety Appliances Company, Pittsburgh, Pa., furnished 14 continuous carbon monoxide recorders for the new Holland Tunnels which connect New York City with Jersey City.

The CO recorders will show as low as two parts in a million of carbon monoxide, and will indicate the condition of the air in the tubes at all times, thereby serving as a guide to proper ventilation.

The Rollway Bearing Company, Inc., manufacturers of radial and thrust roller bearings for railway and industrial purposes, Syracuse, N. Y., have opened a sales office at 956 Leader Building, Cleveland, Ohio. Mr. R. D. Faris has been appointed Cleveland representative.

A real contribution on Safety Work in the Mining Industry is the pamphlet printed by the *Explosives Engineer*, entitled "Preventing Accidents in Mines and Quarries," which reprints safety articles which have appeared in the *Engineer* during the year, as follows:

"What the First National Safety Competition Disclosed; How a Mining District Reduced Its Insurance Rates; Results of the 1926 National Safety Competition; A Safety Switch that Reduces Blasting Hazards; Positive Suggestions for Preventing Accidents; Accident Prevention at the Homestake Mine; The Second National Safety Competition; West Virginia Inspectors' Safety Code; Showing Safety Films Underground; For the Benefit of Their Men; When Is a Stone Quarry Safe?; Practicing the Spirit of Safety; Safety—A Sales Problem."

Copies of this valuable pamphlet may be obtained by addressing N. S. Greensfelder, Hercules Powder Company, Wilmington, Del.

Among the recent bulletins issued by the General Electric Company are GEA-

222, on Ball-Bearing Construction; GEA-801, on G-E Oil Tempering Baths; and GEA 443 A, on Line Material and Rail Bonds for Mines. Copies may be obtained upon application to the Schenectady, N. Y., office.

Among the interesting literature recently released by the Sullivan Machinery Co., Chicago, is information on Sullivan Hammer Drills, Rotator type; Sullivan T-3 Drifter Drills; Sullivan High Pressure Angle Compound Compressors; Sullivan Baby Turbinair and Bravo 300 Diamond Drills. Copies sent upon request to S. B. King, 122 South Michigan Avenue, Chicago, Ill.

The Martindale Electric Co., 1260 West Fifth Street, Cleveland, Ohio, has recently assumed the exclusive sale and distribution of the Hullhorst line of industrial types of commutator undercutters and slotters manufactured by the Hullhorst Micro Tool Co., Toledo, Ohio.

An exclusive Undercutter and Slotter Catalog (No. 9) is now ready for distribution, and copies may be had by addressing the Martindale Electric Co.

WIRE SAW FOR SLATE QUARRYING

THE novel expedient of using a long slender strand of steel, called a wire saw, for the cutting out of huge masses of slate, introduced into this country by the United States Bureau of Mines, promises to result in the elimination of great waste in slate quarrying.

Essentially the wire saw is a three-strand wire cable running as an endless belt. This cable takes the place of the saw blade and the teeth of the saw consist of sand grains carried in the spiral grooves formed by the wire strands.

The saw cable is carried and guided by means of orienting pulleys from the driving unit to the particular place in the quarry where a cut is desired. Sand is automatically fed to the saw by means of trough-shaped boxes using a small stream of water as a conveyor. As the sand is carried against the moving cable it is caught in the grooves and carried along. This results in rapid abrasion, forming a cut about 1/4 in. in width.

As a result of several years of intensive study of the slate industry, Dr. Oliver Bowles, of the Nonmetallic Experiment Station of the Bureau, New Brunswick, N. J., became convinced that much of the excessive waste, varying from 70 to 90 percent of gross production, could be eliminated by the use of more economical equipment. The cooperation of several slate companies was enlisted to purchase a complete wire saw equipment from a Belgian firm. This equipment was set up and tests run in a Pennsylvania slate quarry.

By means of the wire saw, slate, which is a very condensed siliceous rock, is cut at a very rapid rate. In making a cut 80 ft. in length it was found that the wire would sink at the rate of a little more than 2 inches an hour, completing a cut 8 ft. in depth in 45 hours, or five 9-hour days. A cut of the same size by old methods would require two weeks.

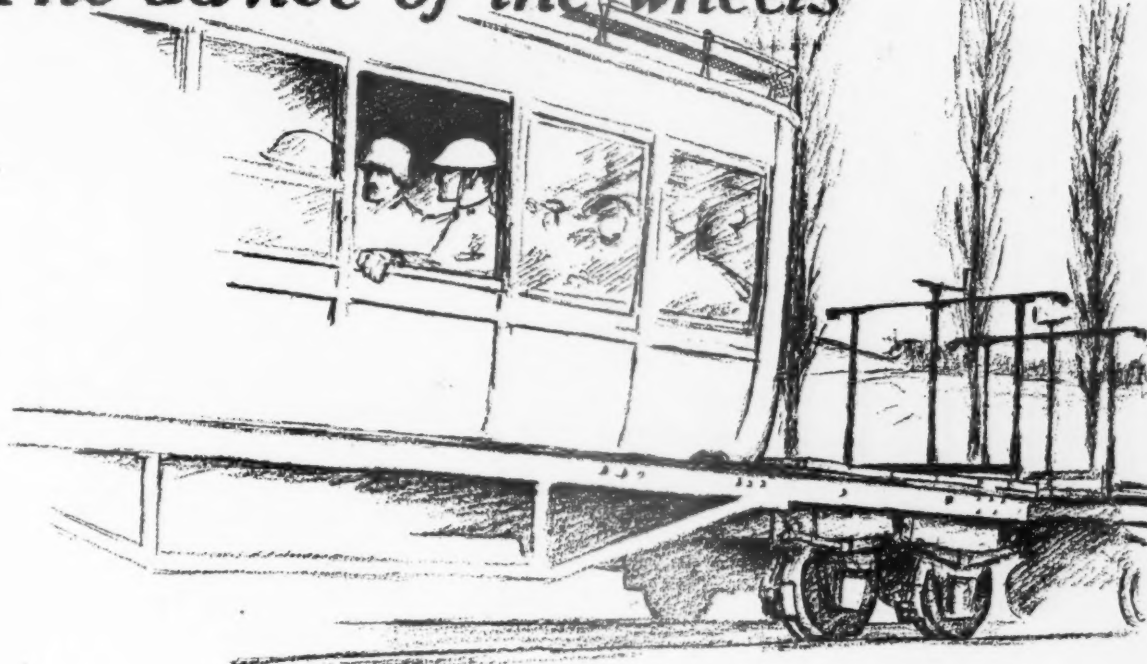
The wire wears remarkably little. A wire 800 ft. long, on completing a cut 80 ft. long and 8 ft. deep, that is after cutting a surface area of 640 sq. ft., was reduced in diameter less than 1/32 inch.

This method of cutting by abrasion rather than by disruptive force, as in the use of explosives, or by the chopping action of the channeling machine, was found to eliminate practically all of the excessive waste directly attributable to these former methods.

Wire saws are now in daily operation in three large Pennsylvania quarries, and other companies are following suit.

The possibility of the successful application of the wire saw in other quarrying and mining industries is suggested by the Bureau of Mines. There is no apparent reason why the wire saw will not cut other rocks. Inquiries have already come from marble quarries, limestone producers and coal miners. Engineers of the Bureau's Nonmetallic Minerals Experiment Station will conduct further tests in the endeavor to give all mining and quarrying industries the full benefit of this new type of equipment.

The advice of the wheels

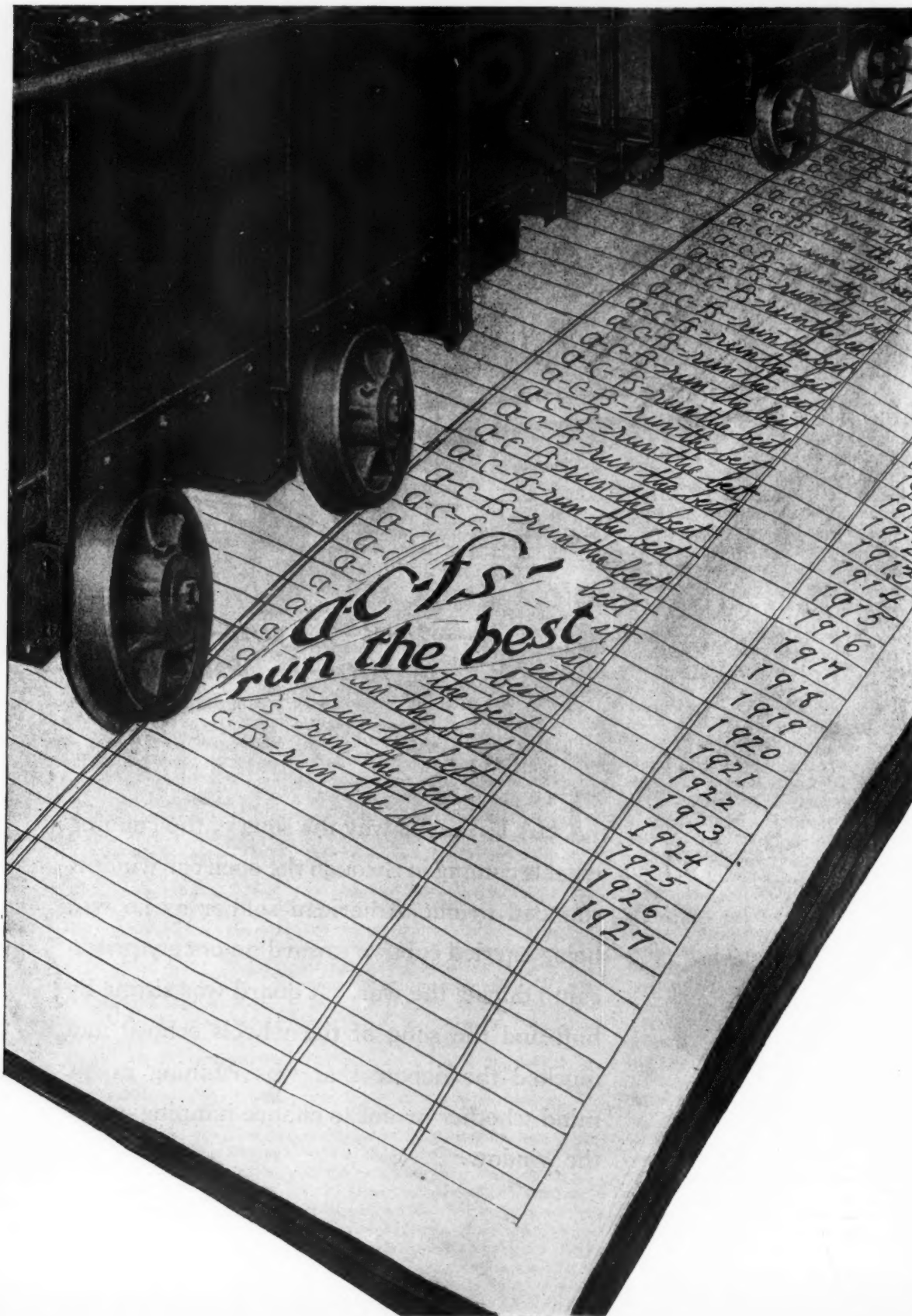


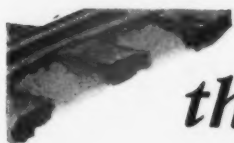
*“—fool - if - you - don't—
fool - if - you - don't—”*

THAT was the way the song of the running wheels coming in through the open car window sounded to one American soldier as he was being carried captive toward an enemy prison camp during the war. A guard was sitting by him and the song of the wheels echoed and mocked the debate that was running in his mind whether or not to chance jumping out of the window.



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Hoffman Bros. Punxsutawney, Pa.

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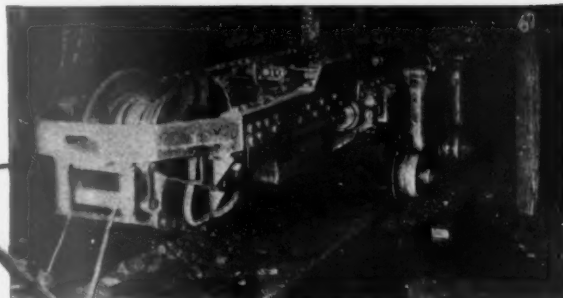
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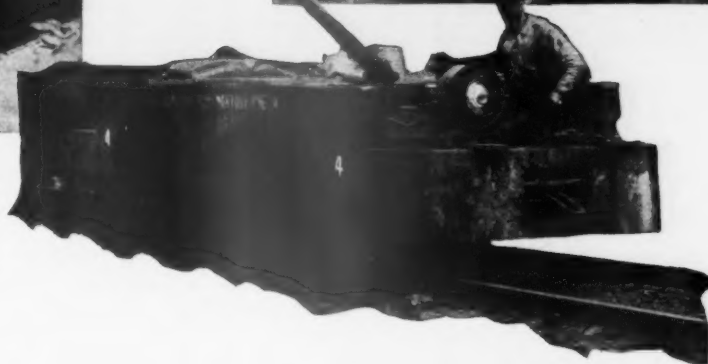
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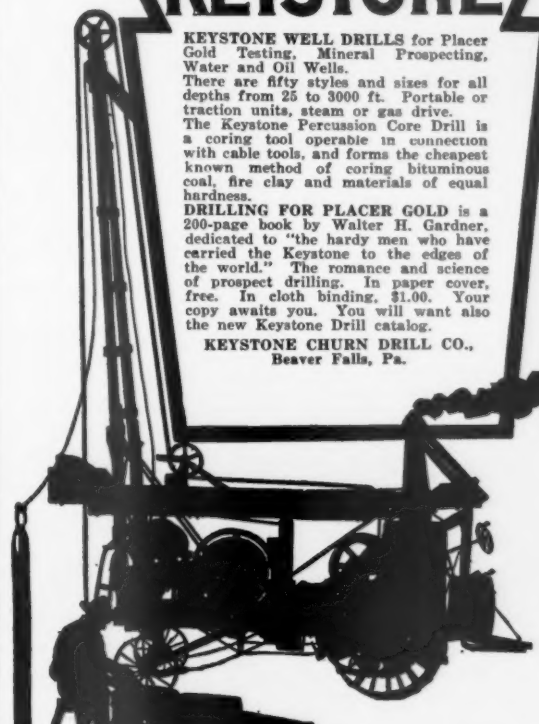
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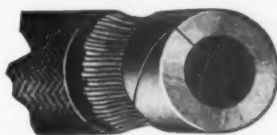
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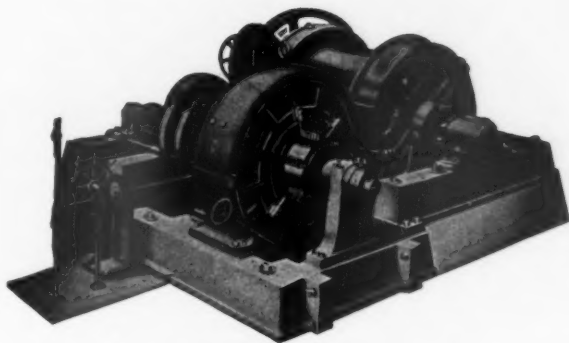
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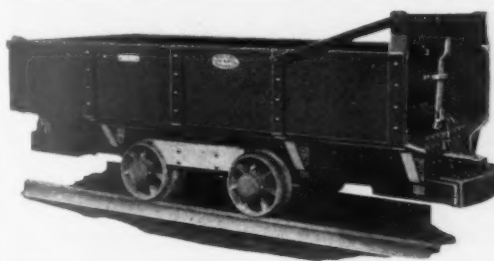
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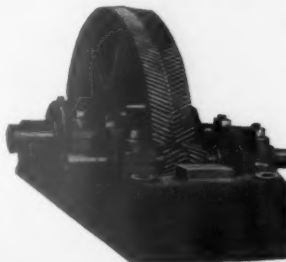
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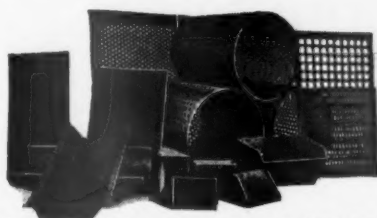
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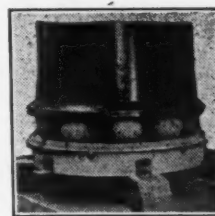


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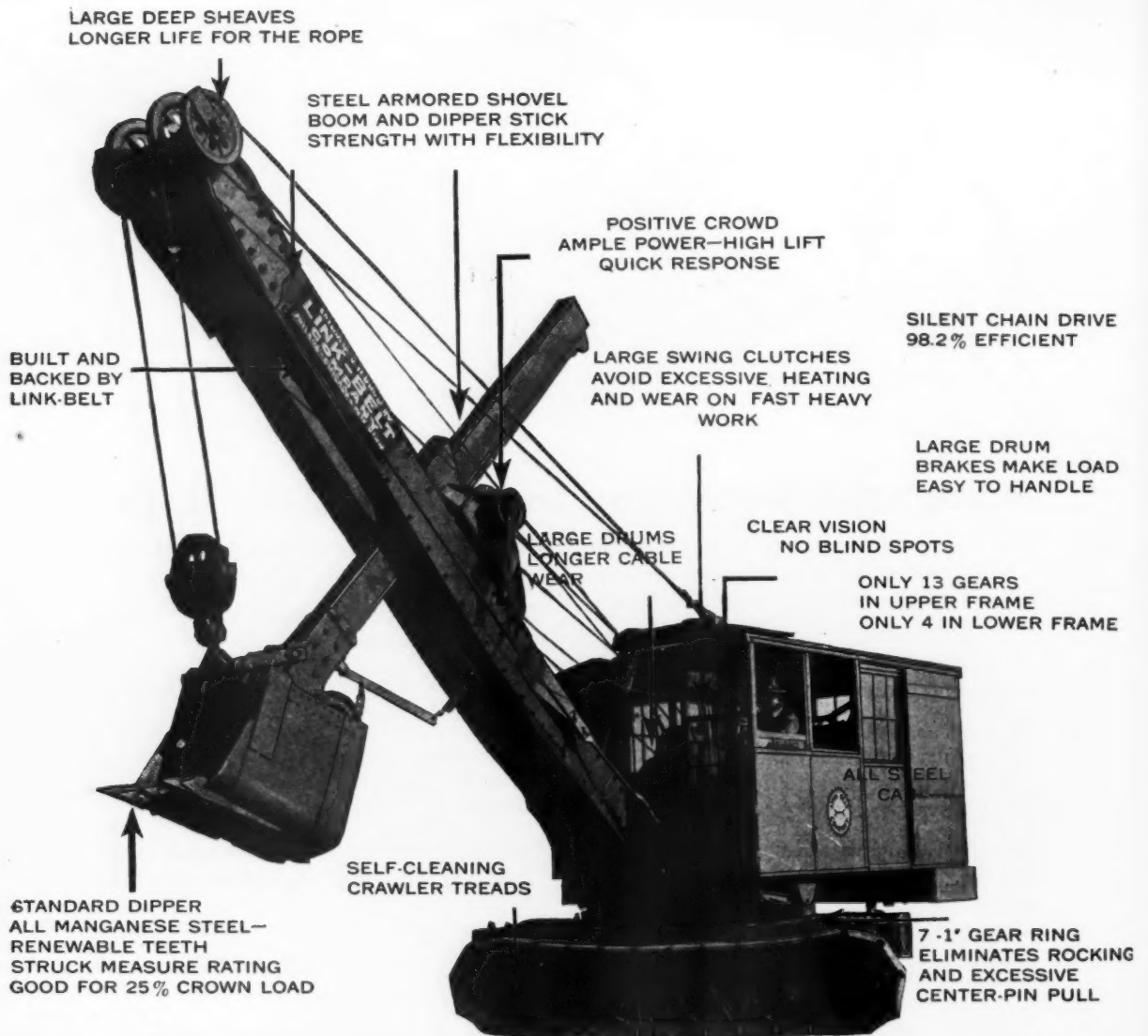
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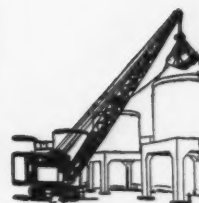
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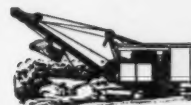
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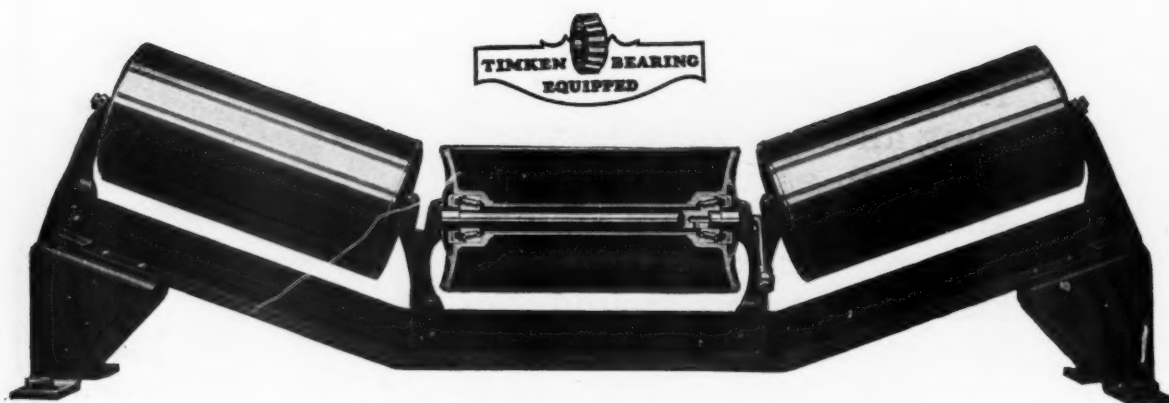


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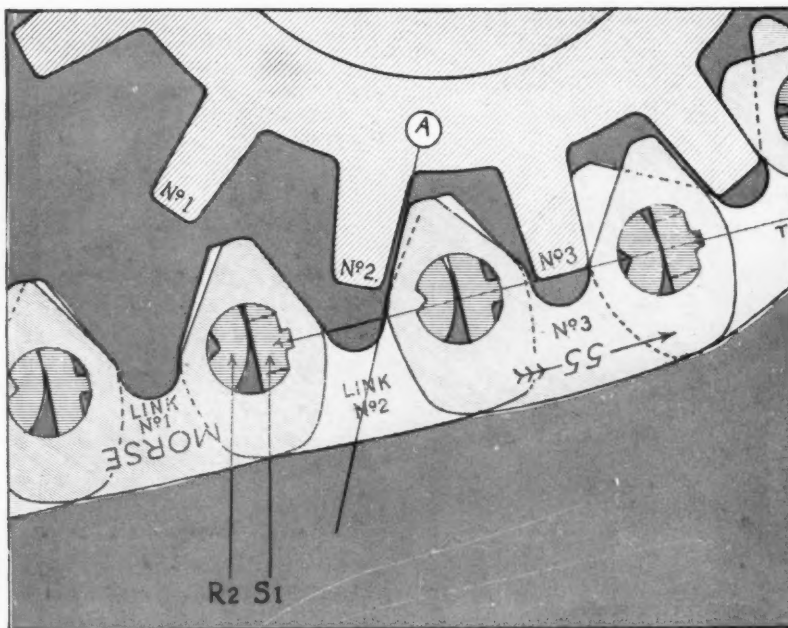
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